VOLUME 46 NUMBER 2 AUGUST, 1958

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THIRD SERIES FOUNDED BY EDWARD JACKSON

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DEPARTMENTS



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*Council on Pharmacy and Chemistry: New and Nonofficial Remedies, Philadelphia, J. B. Lippincott Co., 1956, p. 505.

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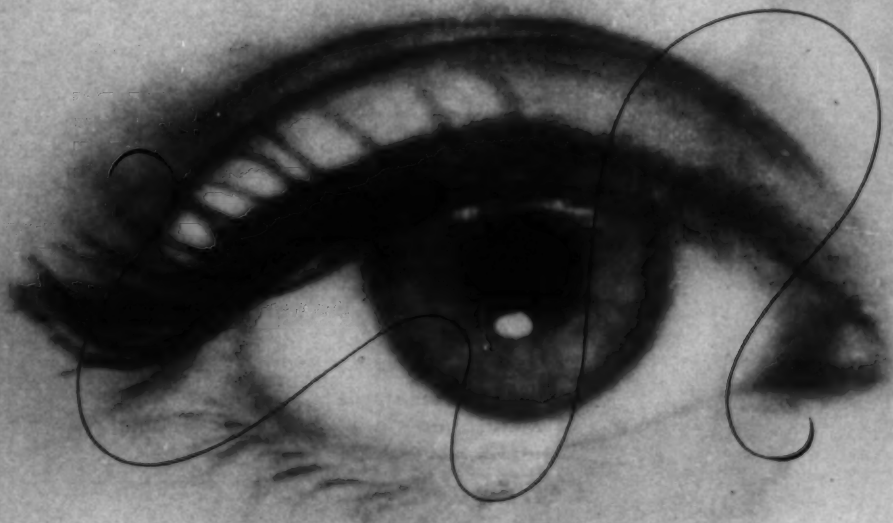

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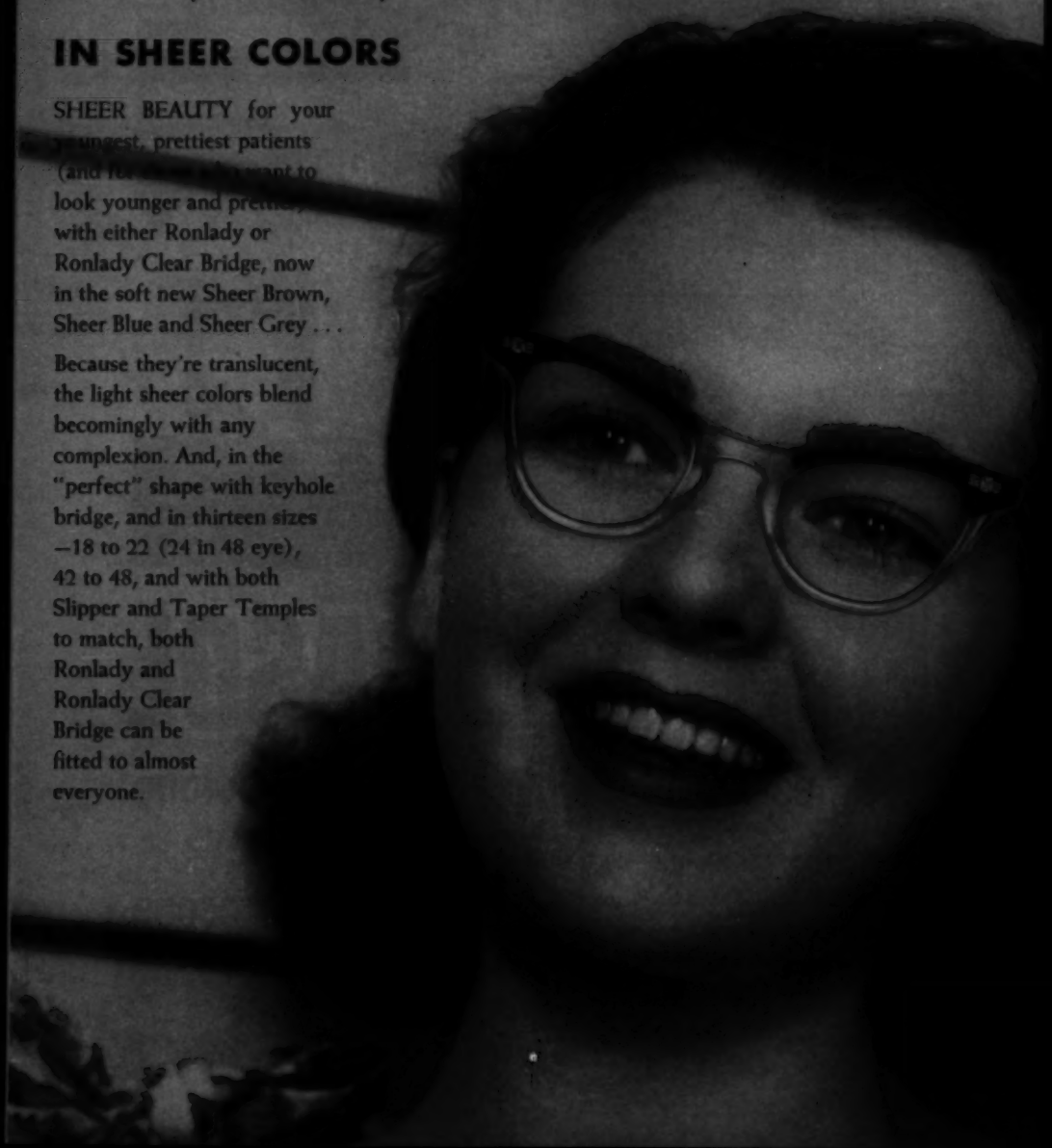


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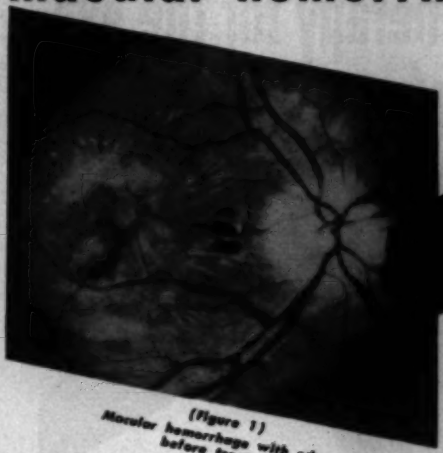

(Figure 1)
Macular hemorrhage with edema, before treatment

(Figure 2)
After 25 days' treatment with Iodo-Niacin

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1. *Am. J. Ophth.* 42:771, 1956.
2. *Am. J. Digest Dis.* 22:5, 1955.
3. *Med. Times* 84:741, 1956.
4. *Cecil's Textbook of Medicine*, 7th ed., 1947, p. 1598.

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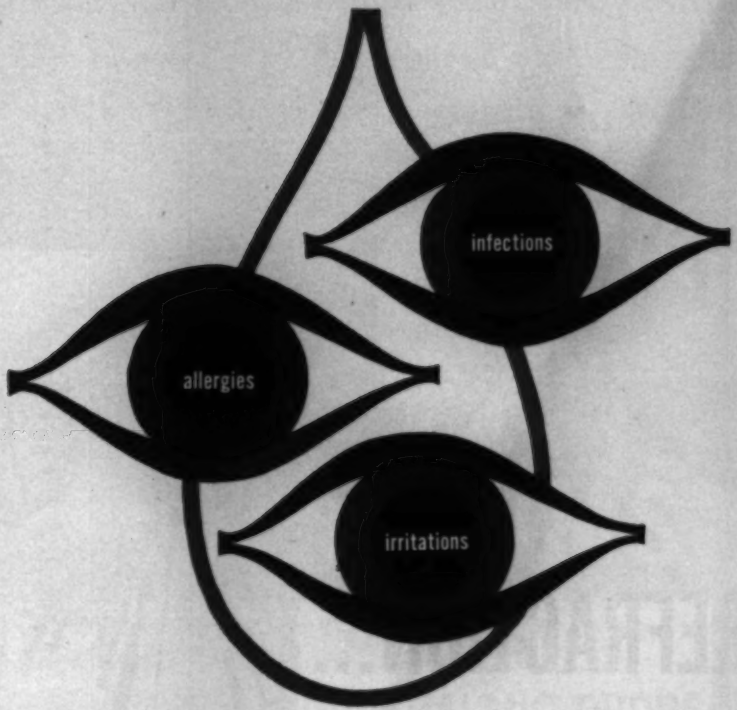


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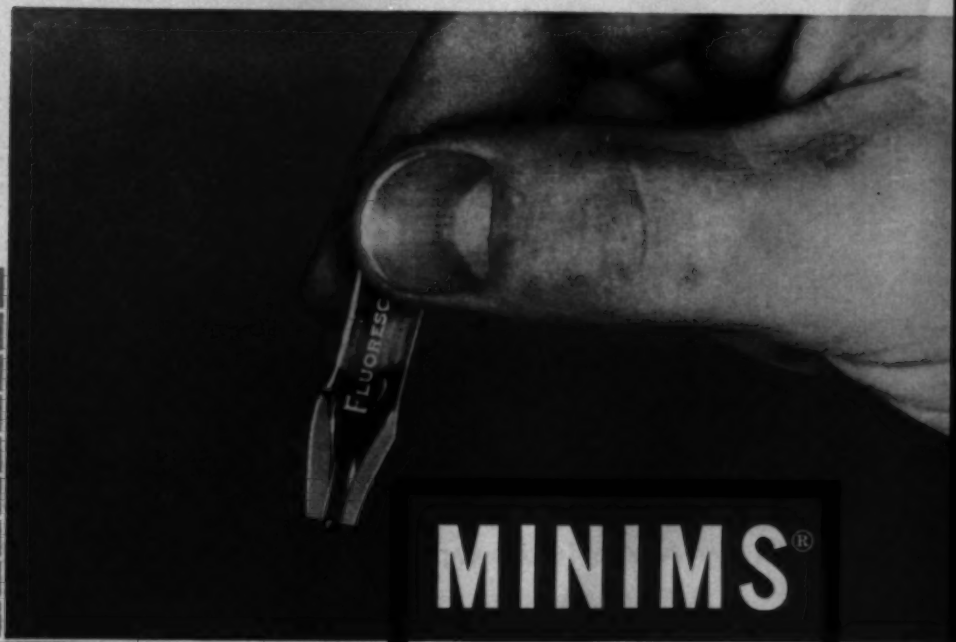


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AMERICAN JOURNAL OF OPHTHALMOLOGY

VOLUME 46 AUGUST, 1958 NUMBER 2

# EXPERIENCES WITH AN ANTERIOR CHAMBER LENS*

WOLFGANG A. LIEB, M.D., AND DUPONT GUERRY, III, M.D.
*Richmond, Virginia*

In a previous report, we have discussed the historical evolution of plastic posterior and anterior chamber implants; and an anterior chamber lens was introduced and described in detail. This lens of converging or diverging type, with resilient mounts attached tangentially to the refractive part, was devoloped in our laboratories (fig. 1). After numerous animal experiments, the lens was used in unilateral aphakic patients. The operative technique employed was cumbersome and somewhat traumatic.

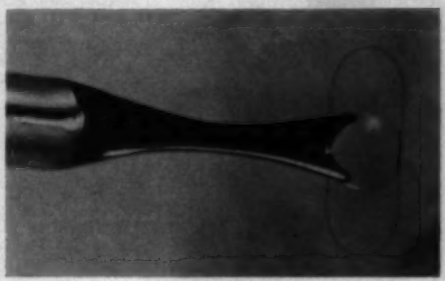

Fig. 1 (Lieb and Guerry). Anterior chamber lens with resilient, peripherally mounted loop supports.

For this technique three special instruments were used: an implantation spatula, a wide-angle keratome, and forceps for grasping the lens tangentially. An incision was made temporally, with a wide-angle keratome, slightly intracorneally and then enlarged to either side with corneoscleral scissors. The section was sufficiently wide to require corneal sutures. An implantation spatula was introduced to protect the pupillary area and the anterior hyaloid membrane. The lens was grasped with an implantation forceps and horizontally introduced into the anterior chamber; later on it was rotated into a vertical position. The sutures were tied, and the procedure was completed.

Our results, employing this technique, were encouraging as regards the tolerability of the lens. A simple and short atraumatic technique has now been used. A review of our results is herewith reported.

## OPERATIVE TECHNIQUE

### A. PREPARATION

A plastic container with 10 lenses of different dioptric powers ranging from nine to 14 diopters and different diameters of the mounting loops ranging from 10 to 14 mm. is available (fig. 2). The patient's refractive error is determined by applying normal cataract glasses at a 12-mm. vertex distance. The spheric equivalent of the astigmatic error is added to the spheric error. The diameter of the anterior chamber is determined by measuring the corneal diameter with a keratometer or any other suitable instrument and adding 0.5 to 1.0 mm.

Due to the different refractive indices between air and aqueous humor, the anterior chamber lens has to have a higher dioptric power to neutralize the refractive error found with a normal spectacle lens. A second reason for the higher power is the decreased lens-retinal distance.

* From the Department of Ophthalmology and the Titmus Ophthalmological Research Laboratory, The Medical College of Virginia. Reported at the 10th Annual Clinical Conference of the Wills Eye Hospital, Philadelphia, Pennsylvania, February 21, 1958, and at the State meeting of the Virginia Society of Ophthalmology and Otolaryngology, Richmond, Virginia, May 3, 1958.

Fig. 2 (Lieb and Guerry). Lens set with 10 anterior chamber lenses with different dioptric strength and diametric length of the flexible supportive part.

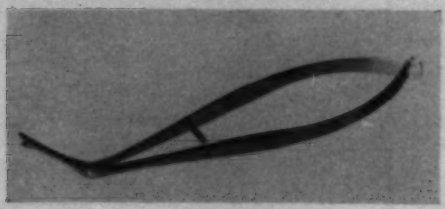

Fig. 3 (Lieb and Guerry). Implantation forceps (latest model).

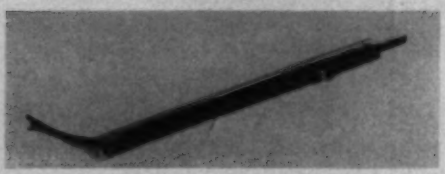

Fig. 4 (Lieb and Guerry). Implantation instrument (latest model) working on the push-button principle.

In our previous report, Table 1 shows the equivalents of dioptric powers in air for external and anterior chamber lenses. Applying this table for each individual operation did not appear to be suitable. Each anterior chamber lens in the operative set is, therefore, labeled corresponding to the spectacle correction.

B. INSTRUMENTS

1. *Implantation forceps* (fig. 3). In the resting position the peripheral part of the lens is held by the plain tips of the forceps; a tiny elevation in the upper or lower blade fits into a notch in the opposite blade to prevent backsliding of the lens.

2. *An implantation instrument* working on the push-button principle (fig. 4) but with similar tips as the instrument described under 1. Both instruments represent a modification of Dannheim's cross-action forceps. (The development of the forceps during recent years is shown in Figure 5.)

3. *A parallel-edged or spade-shaped keratome* (fig. 6) which makes a corneal section with a uniform width of 7.0 mm.

C. IMPLANTATION PROCEDURE

The pupil may be slightly constricted with a 0.5-percent pilocarpine solution. Routine local anesthesia is carried out. A suture

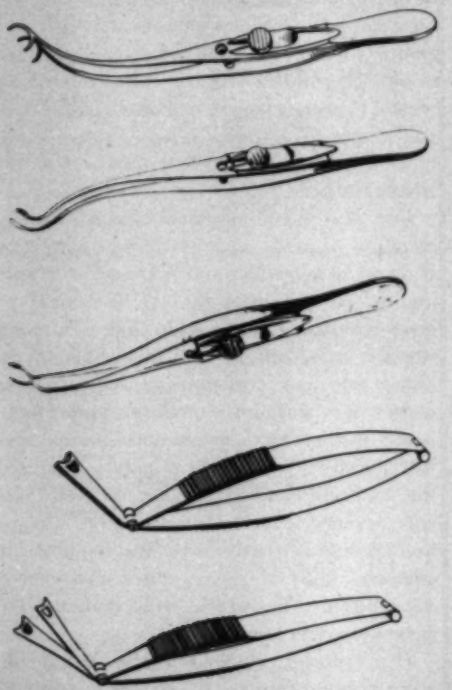

Fig. 5 (Lieb and Guerry). Developmental stages of implantation forceps.

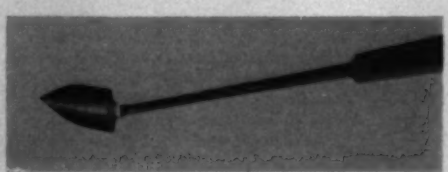

Fig. 6 (Lieb and Guerry). Spade-shaped keratome.

## TABLE 1

REVIEW OF CASES WITH ANTERIOR CHAMBER LENS OPERATED DURING PAST TWO YEARS

| No. | Name Race Sex Age | Diagnosis | Operation | Heterotropia preop. | A C Lens Implant Time in Months | Orthoptic Pleoptic Treatment | Vision Post op. | Heterotropia Post op. | Post op. Course |
|---|---|---|---|---|---|---|---|---|---|
| 1 | G.B. W/W 10 | Traumatic cataract | Discission | + | 24 | + | 20/25 | — | Uneventful |
| 2 | R.C. W/M 45 | Traumatic cataract | Extracapsular extraction, total iridectomy | + | 24 | + | 20/30 | – | Uneventful |
| 3 | J.N. C/F 32 | Traumatic cataract | Extracapsular extraction, peripheral iridectomy | – | 22 | – | 20/20 | – | Uneventful, pigmen. precipitates for 6 wk. |
| 4 | A.B. C/F 28 | Congenital cataract | Linear extraction, peripheral iridectomy | + | 22 | + (amblyopia) | 20/50 | (+) | Uneventful |
| 5 | J.W. C/M 14 | Traumatic cataract | Linear extraction, peripheral iridectomy and iridotomy | – | 22 | – | 20/20 | – | Uneventful |
| 6 | P.N. W/M 45 | Metabolic cataract | Intracapsular extraction, peripheral iridectomy | – | 20 | – | 20/25 | – | Uneventful |
| 7 | L.M. C/F 38 | Traumatic cataract | Extracapsular extraction, peripheral iridectomy | – | 20 | – | 20/25 | – | Uneventful |
| 8 | W.L. C/M 53 | Subluxated traumatic cataract | Intracapsular extraction, peripheral iridectomy | – | 20 | – | 20/80 | – | Moderate reaction for 4 wk; Pigment precipitates for 8 wk. |
| 9 | T.M. C/M 40 | Traumatic cataract | Intracapsular extraction, peripheral iridectomy | – | 19 | – | 20/40 | – | Uneventful |
| 10 | J.D. C/M 40 | Traumatic cataract | Intracapsular extraction, peripheral iridectomy | – | 19 | – | 20/25 | – | Uneventful |
| 11 | G.S. W/M 44 | Traumatic cataract | Intracapsular extraction, peripheral iridectomy | – | 19 | – | 20/40 | – | Uneventful |
| 12 | R.S. C/F 42 | Metabolic cataract | Intracapsular extraction, peripheral iridectomy | – | 18 | – | 20/30 | – | Pigment precipitates for 5 wk. |
| 13 | L.B. W/F 12 | Traumatic cataract | Linear extraction, peripheral iridectomy | – | 17 | – | 20/40 | – | Uneventful |
| 14 | E.L. C/M 36 | Traumatic cataract | Extracapsular extraction, peripheral iridectomy | – | 16 | – | 20/20 | – | Uneventfu |
| 15 | H.R. C/F 11 | Congenital cataract | Linear extraction, peripheral iridectomy | + | 16 | + | 20/80 | + (amblyopia) | Uneventfu |
| 16 | G.D. W/M 72 | Senile cataract | Intracapsular extraction, peripheral iridectomy (combined with A C lens implant) | – | 15 | – | 20/25 | – | Uneventfu |
| 17 | A.M. C/M 15 | Traumatic cataract | Extracapsular extraction, total iridectomy | – | 15 | – | 20/20 | – | Uneventful |
| 18 | S.W. C/F 44 | Traumatic cataract | Intracapsular extraction, peripheral iridectomy | – | 14 | – | 20/25 | – | Uneventful |
| 19 | W.S. W/M 68 | Radiation cataract | Intracapsular extraction, peripheral iridectomy (combined with A C lens implant) | – | 14 | – | 20/20 | – | Uneventful |
| 20 | L.W. C/F 50 | Traumatic cataract | Intracapsular extraction, peripheral iridectomy | – | 12 | – | 20-25 | – | Uneventful |
| 21 | P.H. W/M 18 | Secondary cataract | Discission behind A C lens | + | 10 | + | 20/20 | – | Uneventful |
| 22 | G.B. C/M 44 | Traumatic cataract | Intracapsular extraction, peripheral iridectomy | – | 10 | – | 20/20 | – | Uneventful |
| 23 | H.W. C/M 8 | Traumatic cataract | Discission, peripheral iridectomy | + | 8 | + | 20/20 | – (amblyopia) | Uneventful |
| 24 | W.N. C/F 50 | Metabolic cataract | Extracapsular extraction, peripheral iridectomy | – | 7 | – | 20/25 | – | Uneventful |
| 25 | T.J. C/F 12 | Congenital cataract | Linear extraction, peripheral iridectomy | + | 7 | + | 20/50 | (+) | Uneventful |
| 26 | F.W. W/M 46 | Traumatic cataract | Extracapsular extraction, peripheral iridectomy | + | 5 | + | 20/25 | – | Uneventfu |
| 27 | W.O. W/M 13 | Traumatic cataract | Linear extraction, peripheral iridectomy | – | 5 | – | 20/30 | – | Uneventful |
| 28 | T.G. C/M 51 | Traumatic cataract | Intracapsular lens extraction, total iridectomy | – | 4 | – | 20/30 | – | Uneventful |
| 29 | E.S. C/F 6 | Traumatic cataract | Discission, peripheral iridectomy | – | 3 | – | 20/25 | – | Uneventful |

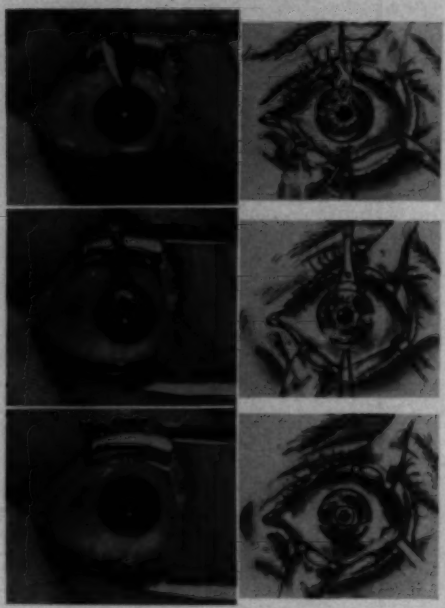

Fig. 7 (Lieb and Guerry). Operative procedure. (Top) Keratome incision. (Center) Introduction of the lens, the resilient loops folding back. (Bottom) Lens in place in the anterior chamber. The peripherally mounted loops resume their normal position.

through the superior rectus muscle may be employed. The different steps of the operative procedure are as follows:

An intracorneal keratome incision is made 0.5 mm. inside the limbus, preferably with a parallel-edged keratome in the preselected meridian (fig. 7—top). The lens is grasped equatorially with the smooth plain tips of the implantation forceps until it meets the resistance of a tiny elevation in the lower blade and in such a fashion that the mounts are on either side. The lens is thrust through the corneal opening into the anterior chamber (fig. 7—center), the flexible mounts folding back as the anterior chamber is entered. As the lens passes well into the anterior chamber, the mounts assume their normal contour and thus come to rest at the posterior surface of the cornea in the region of Schwalbe's line. The tips of the forceps are then slightly opened and withdrawn. In most instances, the procedure is now complete (fig. 7—bottom), with the lens properly positioned. Occasionally, however, the lens may not be properly centered. This is easily accomplished by moving the lens to its proper position with a spatula, force being exerted through the intact cornea. The relatively small intracorneal opening does not require suturing. In one case, a twisting of one of the loops was observed. This was easily corrected by irrigating the anterior chamber with normal saline, thus causing the loop to untwist itself in the anterior chamber.

The pupil is dilated immediately after the operation with neosynephrine (10 percent)

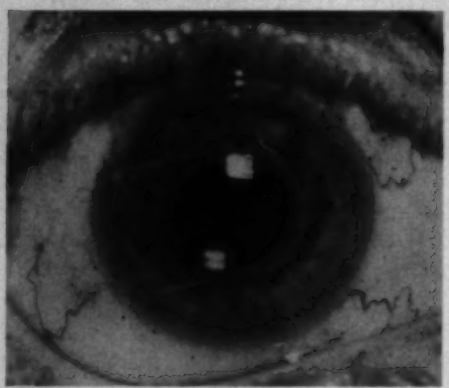

Fig. 8 (Lieb and Guerry). A lens implantation was done in this eye three years after intracapsular cataract extraction. Vision three months after implantation, 20/20.

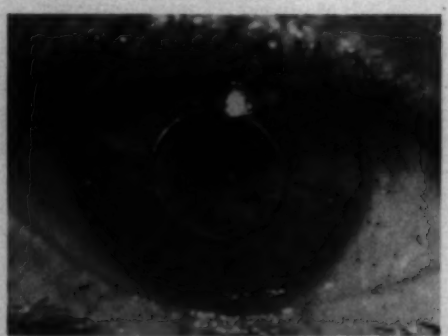

Fig. 9 (Lieb and Guerry). Combined cataract extraction and lens implantation three weeks after operation. Vision, 20/30.

Fig. 10 (Lieb and Guerry). View of an eye with iris coloboma; 15 months after lens implantation. Vision, 20/25.

and atropine (1.0 percent). Except for the usual postoperative care, administration of systemic and local corticosteroids appears indicated in order to assure minimal postoperative reaction. The usual dosage given to an adult patient ranges between 30 and 40 mg. meticorten or from 20 to 28 mg. Aristocort or medrol daily, starting immediately postoperatively, is given over a period of one week and then gradually decreased. Topical application of metisteroids in ointment form is started on the third postoperative day, because we have found, after studying the influence of various cortiscosteroids on corneal wound healing, that topical metisteroids retard wound healing more actively in the first postoperative days than systemic cortisone.

## Review and Discussion

To date 29 anterior chamber lenses have been implanted. All of these have been in unilateral aphakics whose cataracts were of traumatic, degenerative, congenital, metabolic, or radiation etiology. The age distribution ranged from six to 72 years. Twenty-seven cases were operated in a two-stage procedure; that is, patients operated previously for their cataracts and the lens later implanted—not earlier than two to three months. In these patients, intracapsular, extracapsular, linear extractions, or discissions of the cataracts had been performed. Some of the patients of this group had had their cataracts removed some years prior to implantation.

In two cases, a one-stage procedure was performed; that is, the lens was implanted directly after intracapsular cataract extraction. A review of the cases is shown in Table 1.

In all cases which were operated, the eyes were completely quiet, there being no cells or flare present prior to implantation. No visible signs of degeneration were present on cornea or iris, and gonioscopic examinations prior to implantation revealed a completely open angle. In no case was vitreous present in the anterior chamber. All cases operated by means of the new technique failed to show pigment deposits or other visible irritation which could be related to the implant. This was in contrast to our previously reported cases, where in several instances pigment precipitates appeared on the surface of the lens. Although this pigment did not

Fig. 11 (Lieb and Guerry). View of an eye 12 months after lens implantation. Vision, 20/30.

interfere with vision and was absorbed within a few weeks, it is felt that it was due to the greater operative trauma incident to the old implantation technique. The postoperative reaction in all cases operated with the new technique did not extend over a period of from two to four days. The patients were subjected to bed rest only on the first postoperative day and were, in general, hospitalized three to five days.

In two cases, a bulging of the anterior limiting membrane of the vitreous was present after intracapsular extraction. Here, the anterior vitreous surface was later found to be slightly attached to the posterior surface of the lens. This condition did not interfere with the visual result, and repeated tension controls did not give any evidence of an increased intraocular pressure. Tonography showed that the values of the facility of outflow and the rate of flow did not show any alterations compared with the fellow eye. In no instance was an implantation procedure performed on eyes which had vitreous in the anterior chamber.

In two cases, the lens was implanted in eyes which had a complete coloboma at the 12-o'clock position. In these cases, the lens was introduced from the opposite side at the 6-o'clock position. The supportive loops were positioned perpendicular to the coloboma. No complications were observed over a period of 12 and 16 months respectively.

In another case where an anterior synechia was present at the 1-o'clock position, the lens was introduced in the 6-o'clock position without complications.

The two cases operated in a one-stage procedure deserve special consideration. In both instances, an intracapsular extraction with two peripheral iridectomies was performed and the lens was implanted immediately afterward. In the first case we felt that an immediate dilatation of the pupil would increase the danger of a possible iris prolapse; therefore, dilatation was omitted. As a result of this, several synechias between pupillary margin and anterior limiting membrane of the vitreous were found. On the second postoperative day sympathicomimetic and parasympathicolytic drugs were administered but the pupil remained fixed. Although this condition has persisted over one year, a pupillary block has not occurred. In the second case of the one-stage procedure, through immediate postoperative dilatation, this complication was prevented. It was felt that, because of this risk, the two-stage procedure would be preferable.

In our first cases we observed some slight eccentric displacement of the lens. This was due to the difficulty of obtaining an accurate estimate of the diameter of the anterior chamber, and the displacement was caused by choosing a lens with supports of insufficient length. Although such a displacement was noticed in four cases, it did not interfere with the visual acuity, and the refractive error did not exceed $\pm 1.0$D. sph.

In one case, the vision of the patient was decreased to 20/50 by a slight secondary membrane. A discission of this membrane was successfully performed behind the implanted anterior chamber lens, and vision was improved to 20/20. Although in this patient a postoperative reaction was not observed, the authors would like to stress the fact that an anterior chamber lens should not be implanted in eyes which show a thickened secondary membrane until the membrane has been successfully discissed.

An interesting phenomenon was observed in six patients with unilateral aphakia associated with a marked exotropia or esotropia. In each case after the first post operative days, this deviation disappeared spontaneously. Stereopsis was achieved in 15 of the 29 cases.

Another possible indication for lens implantation, in our preliminary experience, is in aphakic cases complicated by amblyopia ex anopsia if pleoptic and orthoptic exercises show improvement.

The visual results of our 29 patients are

encouraging. In 18 patients, a visual acuity of 20/25 or better was achieved within a +2.0D. or −2.0D. correction. In the remaining cases, the visual acuity was comparable with the aphakic corrected vision or slightly better. In no case was the vision decreased compared with that obtained with conventional lenses.

Constant checks on intraocular pressure were done. Every month tonometry and every three months electronic tonographic records were made. The mean findings between normal fellow eyes and operated eyes did not show any significant difference in values for intraocular pressure, flow, or facility of outflow.

Although two years of experiences in humans have shown encouraging results, we still believe that cases for anterior chamber lenses should be critically selected. Far from knowing the final results of this method, we feel justified to continue the work in this direction.

On the basis of our preliminary experiences, our indications and contraindications for this procedure are:

A. Indications

1. Unilateral traumatic, metabolic, degenerative, radiation and senile cataracts.

2. Unilateral congenital cataracts are questionable, due to the amblyopia.

3. The cataracts should be removed at least two to three months previous to the implantation. The "two-stage" procedure is, therefore, preferable.

4. An absolutely quiet eye.

5. The eye should be correctable to 20/20 or 30/30, in order to later achieve stereopsis. (Certain amblyopic cases, in which marked improvement of the visual acuity can be expected, may be an exception to this rule.)

6. At least one peripheral operative iris coloboma should be present.

7. A complete operative iris coloboma, especially if located at the 12-o'clock position, is not a contraindication.

8. May be utilized after all types of cataract surgery, as long as no complications are involved.

9. Tropia due to the unilateral aphakia is not a contraindication.

B. Contraindications

1. Secondary or primary glaucoma.

2. Vitreous in the anterior chamber.

3. Dense secondary cataracts unless properly discissed.

4. Eyes which are predisposed to sympathetic ophthalmia.

5. Nongranulomatous or granulomatous uveitis.

6. Any fundus pathology, especially macular degeneration and old reattached retinal separations.

7. All cases which show gonioscopically a narrow angle.

8. Corneal degenerations.

9. Shallow anterior chamber.

10. Fixed pupil, due to posterior vitreous synechias.

An interesting problem is presented in high anisometropic cases. We have previously reported animal experiments in which our lenses were implanted on top of the clear crystalline lens, and in all no clouding of the normal lens was observed. Since that time the diverging type lens has been further improved (figs. 12-a and b) and implanted in 24 more animal eyes. These animals failed to show any disturbance in their crystalline lenses over an observation period of two years. Calculations and measurements to determine the values of anisocoria revealed that only very small differences of the image sizes would occur. Barraquer, Schreck, et al. reported on the use of myopic lenses with solid supports in human eyes. This procedure offers an interesting prospect for high anisometropic cases.

Summary

Our experiences with an anterior chamber lens developed in our laboratory are reported.


Fig. 12 (Lieb and Guerry). Experimental diverging type lens. (A) First model. (B) Last model.

A simplified operative technique for insertion of this lens is described, and the results in 29 patients operated over a period of two years are discussed. No case of secondary glaucoma occurred.

A two-stage operative procedure is given preference over a one-stage operative procedure.

Indications and contraindications are listed. Experimental work on the correction of anisometropia is described.

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# CONGENITAL TOXOPLASMOSIS*

## Chorioretinitis as the only manifestation of the disease

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There is an inflammation of the choroid and retina which I have come to recognize with increasing frequency, being characterized by reliable evidence of its congenital origin, a tendency to bilateral involvement of the macula—often with recurrence after many years—and, in my experience, invariable serologic signs of toxoplasmosis in the absence of any other manifestation of that disease, congenital or acquired.

Chorioretinitis, often bilateral and central, is a constant finding in congenital toxoplasmosis. Hydrocephalus, convulsions, and intracerebral calcifications are described along with the eye inflammation as important clinical features that make up the syndrome. Many variations are known. Other common findings in congenitally infected infants that survive for any length of time are mental retardation, microcephaly, muscle paralysis, microphthalmos, optic atrophy, nystagmus, and squint.

The causative agent, Toxoplasma gondii, shows a predilection for nervous tissue. Almost any neurologic or ophthalmic defect might be expected then, depending upon the location and extent of central nervous system and ocular involvement. It is the purpose of this paper to point out the variable nature of the abnormalities caused by congenital toxoplasmosis and to propose that chorioretinitis is not only the most constant of these but, indeed, may be in some cases the only clinically detectable sign of the disease.

First, eight previously unreported cases of congenital toxoplasmosis will be described in order to emphasize the variations possible in both neurologic and ocular findings. The diagnosis in these eight examples has not been confirmed pathologically or by isolation of the parasite but seems certain from a clinical standpoint. Later, 11 cases will be presented in which chorioretinitis is the only sign of what is very probably con-

* From the Division of Ophthalmology, Medical College of Georgia. This study was supported in part by the National Institutes of Health, Public Health Service, Bethesda, Maryland, and in part by the National Society for the Prevention of Blindness.

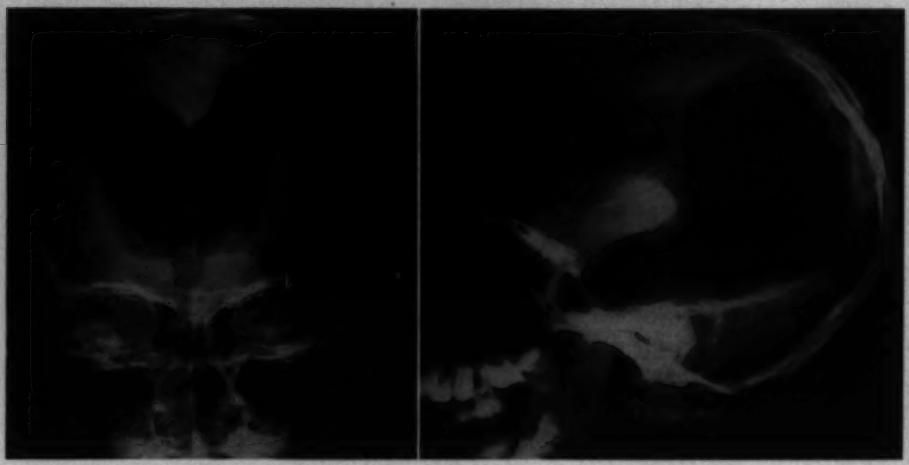

Fig. 1 (Fair). Case 1. Internal hydrocephalus and brain atrophy of congenital toxoplasmosis.

genital toxoplasmosis along with 10 other cases in which the same diagnosis is likely, but somewhat less certain.

## Case reports

### Case 1

A male Negro child, nine years of age, was first seen in January, 1957, after being hospitalized for investigation of a single, unprecedented, generalized convulsive seizure which had taken place 16 days before. A left wrist drop which appeared after the convulsion was thought to be due to hypodermic injections given in the upper arm. Birth and early development were supposed to have been normal. There had been only the usual childhood diseases but 18 months prior to admission an attack of acute glomerulonephritis had required a two-month stay in bed. The child's mentality was considered by his mother to be normal.

General physical examination revealed only the left radial nerve palsy. Skull X-ray studies showed numerous minute opacities of calcific density scattered in the parietal areas of the brain. These did not follow the course of the ventricular system. Ventriculogram revealed a marked internal hydrocephalus with advanced brain atrophy (fig. 1). A specimen of brain tissue removed through a burr hole at the time of this procedure was ground, suspended, and injected into mice by several routes. After five blind passages, no growth was reported.

On eye examination, there was noted a 20 prism diopter right internal squint. Visual acuity was recorded as: R.E., counting fingers at six inches; L.E., 20/20. The right eye was normal outwardly. The media were clear. Funduscopic examination revealed an advanced optic atrophy of the primary type. On the left, external examination showed nothing abnormal. The media were clear. The nervehead was normal as was the central retina. In the upper nasal midperiphery of the fundus was seen a large, heavily pigmented chorioretinal scar, typically inflammatory in origin.

Following the ventriculogram, a collection of cerebrospinal fluid appeared beneath the scalp. When this continued to increase in size for several weeks, a third ventriculostomy was performed. At the time of this operation the right optic nerve atrophy was explained by the finding that the floor of the anterior third ventricle was bound down tightly by dense adhesions to the right nerve and chiasm and had to be dissected away before the operation could be completed.

Skin test* for toxoplasmosis was positive. The Sabin-Feldman dye test† was reported as positive in a dilution of 1:1,024. The mother's dye test was positive in the same dilution. It was felt that the combined clinical and serologic evidence in this case justified a diagnosis of congenital toxoplasmosis. The unilaterality and peripheral location of the chorioretinitis is the point which bears on the discussion to follow.

### Case 2

A female Negro child, aged 12 years, was first seen in December, 1956, when she was hospitalized for investigation of generalized epileptiform seizures which had begun six years before. The patient

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* Skin test antigen was graciously supplied by Dr. C. N. Christensen of the Lilly Research Laboratories, Eli Lilly and Company, Indianapolis, Indiana.

† Dye tests were kindly performed by Dr. Leon Jacobs, National Institutes of Health, Bethesda, Maryland.

was severely retarded mentally but birth and early development were supposed to have been normal. History in this case, although supplied by the mother, was particularly unreliable.

General physical examination revealed no significant abnormality. On eye examination, visual acuity could not be determined because of the child's inability to co-operate. The eyes were straight. External examination showed nothing abnormal. On the right, the eye was very myopic. A remnant of the hyaloid system was suspended in the vitreous before the disc. In the temporal periphery, there was seen a large, healed chorioretinal scar. On the left, the media were clear and the fundus normal. Skull X-ray films showed large intracerebral calcifications which did not seem to follow the outline of the ventricular system (fig. 2).

Spinal fluid pressure was normal. Pneumoencephalogram demonstrated a deformity of the right lateral ventricle suggesting scarring of the hemisphere. Electroencephalogram recorded paroxysmal dysrhythmia with subclinical petit mal and grand mal seizure bursts.

Skin test for toxoplasmosis was doubtful. Dye test was positive in a dilution of 1:1,024. The mother's dye test was positive 1:256.

Again, importance will be claimed for the atypical location and unilaterality of the chorioretinitis in this case.

### Case 3

This patient, a 20-year-old white woman, had been hospitalized for years in a state institution for mentally retarded children. History as to birth and early development was unavailable. She suffered frequent generalized convulsive seizures and was so severely retarded, mentally and physically, as to be completely bedridden. The head was small.

Skull X-ray films showed two large intracerebral calcifications. The right eye was extremely small and blind (fig. 3). The left eye was normal externally and the media were clear. The nervehead was normal. A tremendous chorioretinal scar was located centrally and a second old, healed inflammatory process was noted below the disc.

Skin test for toxoplasmosis showed only three or four mm. of erythema. Dye test was positive 1:256. The patient's mother was not available for testing. A clinical diagnosis of congenital toxoplasmosis seems justified in this case. The eye findings are classical as compared with those in the preceding two cases.

### Case 4

A 23-year-old white woman, an inmate in an institution for mentally retarded children, was located during a search for cases of congenital toxoplasmosis using the skin test and ophthalmoscope (Fair).

Eye findings were internal squint, ocular nystagmus, a large central chorioretinal scar with scattered peripheral lesions and secondary optic atrophy on the right, and a large healed inflammatory lesion in the temporal periphery of the fundus on the left. Although the macula was not affected primarily in the left eye, its appearance was abnormal as a result of the severe disturbance beyond in the peripheral retina and the vision in this eye was reduced to approximately 2/200. Skull X-ray films showed several intracerebral calcifications. There had never been any conclusive seizures.

Skin test for toxoplasmosis was positive. Dye test was positive 1:256. The mother's dye test was positive 1:256. The location of the chorioretinitis in this case—central in one eye and peripheral in the other—is called to the attention of the reader.

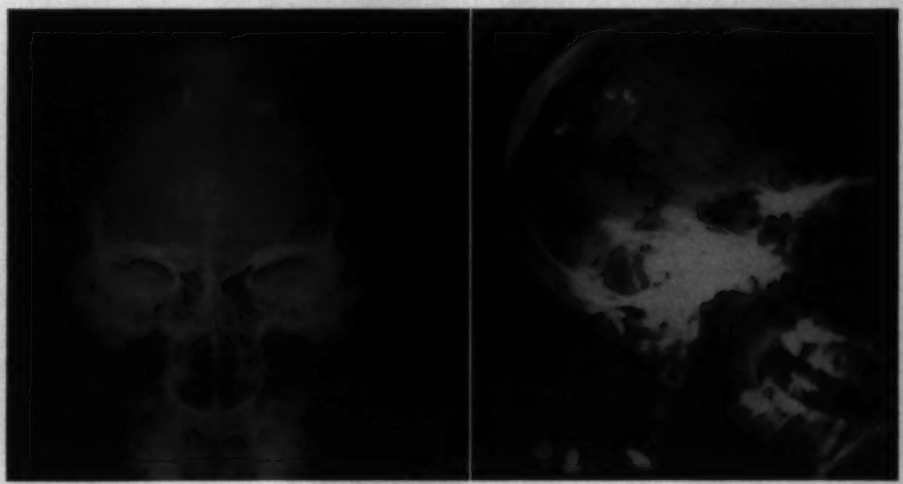

Fig. 2 (Fair). Case 2. Intracerebral calcifications of congenital toxoplasmosis.

Fig. 3 (Fair). Case 3. Microphthalmos of congenital toxoplasmosis. The right eye was extremely small and blind.

CASE 5

This 24-year-old white woman, another inmate in an institution for mentally retarded children, suffered generalized convulsive seizures and manifested an internal squint, ocular nystagmus, and bilateral central chorioretinal scars. Skull X-ray films showed no intracerebral calcifications. Skin test for toxoplasmosis was positive and dye test was positive 1:256. The mother of the patient was dead. The eye findings are considered to be typical of the disease.

CASE 6

A 16-year-old white girl, found living at home, had been retarded since birth. There was no history of convulsions and skull X-ray films showed no intracerebral calcifications.

Vision could not be determined because of the patient's inability to co-operate. There was a left external squint. In each eye, the media were clear. On the right, the nervehead and central retina were normal. Several small healed inflammatory foci were seen scattered about both the central and peripheral retina. On the left, there was found a very large, inactive, central chorioretinal lesion (fig. 4) and several smaller peripheral scars.

The patient's dye test was positive 1:1,024. The mother's dye test was positive 1:512. Here again is an incomplete syndrome but the bilaterality and central location of the eye inflammation with mental retardation and positive serologic tests in mother and offspring justify, in my opinion, a diagnosis of congenital toxoplasmosis.

CASE 7

A nine-month-old white boy was first seen in July, 1952, because his right eye was smaller than the left and had turned in since birth. There had been three minor convulsions prior to his being seen and these continued afterward at increasingly frequent intervals. General physical examination showed no evidence of motor or mental retardation. An electroencephalogram revealed no paroxysmal or focal abnormality. Skull X-ray studies showed no intracerebral calcifications. The head was of normal size. No air studies were performed.

Eye examination showed a microphthalmos on the right, mild in degree. There was a right internal squint. In the right eye, the media were clear. The nervehead was normal as was the central retina. In the nasal mid-periphery of the right fundus and extending beyond the limits of visibility was a large pigmented area suggestive of a healed inflammatory process. The left eye was normal in all respects.

Dye test was positive in a dilution of 1:2,048, one month later, 1:16,384. The mother's dye test was positive at the same time in a dilution of 1:256.

CASE 8

A 12-year-old white girl was located in an institution for mentally retarded children. She had had "dancing" eyes all her life and vision had always been poor. At one time, she had been enrolled in a state school for blind and partially sighted children. Ocular findings were pendular nystagmus, squint, and bilateral, healed, central chorioretinal scars. There was no history of convulsions. Skull X-ray films showed no intracerebral calcifications. Skin test for toxoplasmosis was positive and dye test was positive 1:1,024. The mother's dye test is unreported at the time of this writing.

The description of these eight cases is intended to show that considerable variation in clinical signs may be expected in congenital toxoplasmosis. The diagnosis might be questioned in any one case but, thought of as a group along with the invariably positive serologic tests in the patients themselves and those mothers who were available for testing, their connection with toxoplasmosis seems certain. No similar cases have been seen in the same length of time with negative serologic tests for toxoplas-

Fig. 4 (Fair). Case 4. Large central chorioretinal lesion in left eye.

mosis. The one requirement seems to be chorioretinitis. The presence or absence of convulsions, intracerebral calcifications, mental retardation, hydrocephalus, microcephaly, and so forth, depends upon the extent and location of the brain inflammation. Considerable brain damage must take place to produce these marked changes. Theoretically at least, a mild infection of the brain might leave no clinically apparent sign of its passing, but not so in the eye. Even a relatively slight inflammation in the central retina results in serious visual loss and bilateral involvement may be responsible for real visual disability with the squint and nystagmus that follow. Peripherally located lesions may cause no subjective difficulties but leave unmistakable ophthalmoscopic signs of the disease.

In the past, because so little was known, one hesitated to make a diagnosis of congenital toxoplasmosis unless in each case it was possible to isolate the organism or demonstrate its presence in pathologic material. For this reason, only the most severely affected patients were described because these were the cases in which definitive studies could be made. As our knowledge increases, we are able to place more and more reliance on clinical signs and serologic and immunologic tests. Obviously, many lesser forms of the disease exist.

In the patients just described, brain damage varied from severe to mild with a corresponding variation in the neurologic defects. Every patient, however, showed easily discernible ocular damage. Conceivably, mild infections or infections by organisms of low virulence might cause clinically inapparent disease except for the tell-tale signs in the eyes. Such a possibility is the subject of this report.

Twenty-one cases have been collected in which history, physical findings, and serologic tests combine to suggest a diagnosis of congenital toxoplasmosis in which chorioretinitis is the only clinical manifestation of the disease. Selection was based on several factors, the importance of which will be more apparent upon presentation of the cases.

Briefly, these are:

1. The presence of chorioretinitis.
2. Bilaterality of the chorioretinitis.
3. Centrality of location of the chorioretinitis.
4. Evidence of congenital origin such as life-long poor vision, squint, and nystagmus.
5. Associated developmental ocular defects such as high myopia, remains of the hyaloid system, and microphthalmos.
6. Tendency toward recurrence of the inflammation—sometimes after many years of inactivity.
7. Positive immunologic and serologic tests for toxoplasmosis in both the patients themselves and in those mothers who were available for testing.

Again, the diagnosis might be questioned in any individual patient but these cases are seen so often in ophthalmic practice as to constitute a clinical entity in which the connection with congenital toxoplasmosis cannot be ignored.

### Case 9

This patient, a 23-year-old white soldier, was seen in 1952 complaining of blurring of vision in the right eye of two weeks' duration. There had been no similar trouble in the past. The vision in his left eye had been poor all his life and the left eye had always turned in.

Examination showed a left internal squint due, apparently, to an old, healed central chorioretinitis (fig. 5-b). In the right eye, there was found a large central chorioretinal scar (fig. 5-a) with reactivation of the inflammatory process along one edge of the lesion that accounted for the recent disturbance of vision.

Skin test for toxoplasmosis was positive. Dye test was positive 1:64, later, 1:256. This case was mentioned briefly in an earlier report (Fair, 1954). Congenital toxoplasmosis was considered at the time There was no history of convulsions. Skull X-ray films showed no intracerebral calcifications. Mentality was normal. No effort was made to locate the patient's mother.

### Case 10

A 29-year-old white woman had had very poor vision in her right eye as long as she could remem-

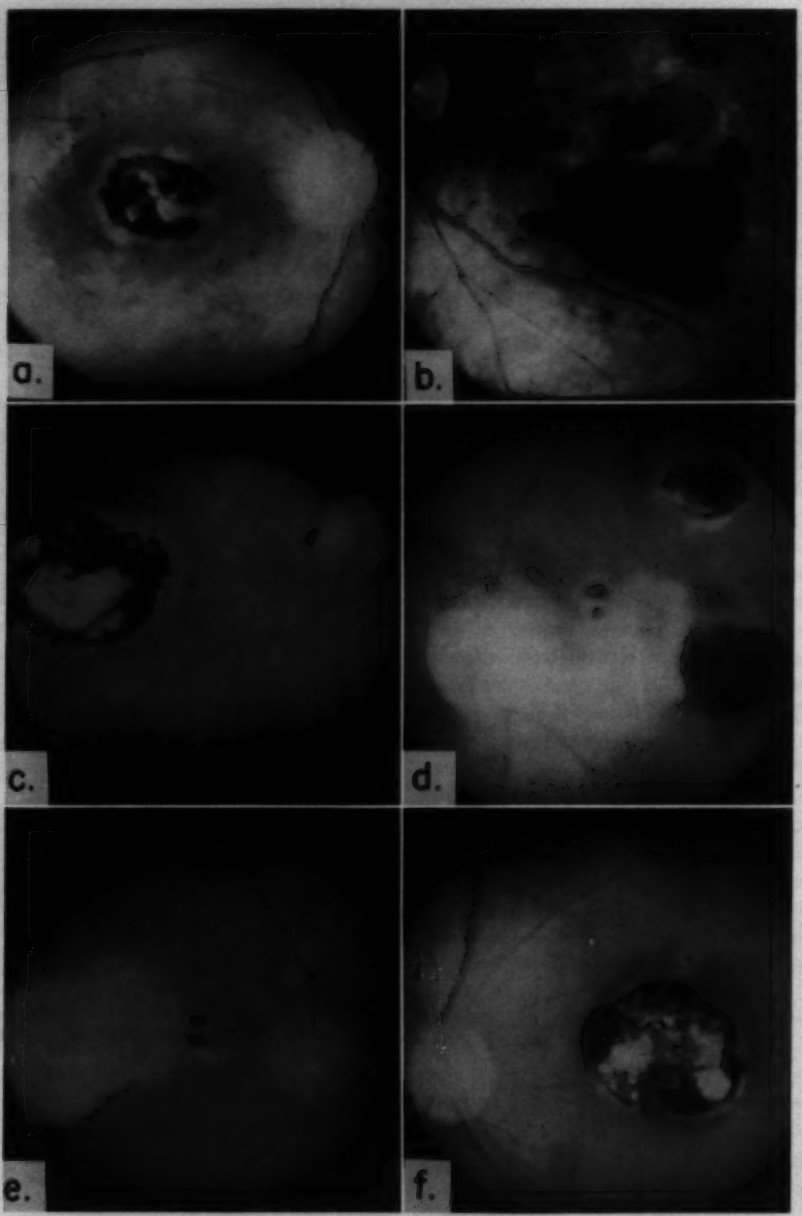


Fig. 5 (Fair). Chorioretinitis suggesting congenital toxoplasmosis. (a) Right eye, Case 9. (b) Left eye, Case 9. (c) Right eye, Case 10. (d) Left eye, Case 10. (e) Right eye, Case 11. (f) Left eye, Case 11.

ber. There had been no trouble with the left eye until 10 days prior to examination when she developed redness and pain in the left eye and decrease in vision.

On examination, the eyes were straight. There was found in the right eye a very large, healed, central chorioretinal lesion (fig. 5-c) with many smaller scattered peripheral scars. On the left, the cornea was dotted with fresh, small gray-white precipitates. There were no cells in the aqueous and no synechiae had formed. The posterior vitreous was filled with exudate and small hemorrhages. Through the haze there could be seen an old, heavily pigmented chorioretinal scar. Between this and the disc the inflammation had recurred. The peripheral retina was normal.

A course of pyrimethamine (75 mg. daily) and sulfadiazine (4.0 gm. daily) for two weeks produced no apparent change. In the next few months, the vitreous gradually cleared revealing the chorioretinitis—both old and new (fig. 5-d)—with optic atrophy and permanent reduction of vision to 10/200.

The skin test for toxoplasmosis was positive. The dye test was positive 1:1,024. The mother's dye test was positive 1:64.

In this case birth and early development are supposed to have been normal. Mentality is borderline. There were only the usual childhood diseases without sequelae. General physical examination showed an advanced rheumatoid arthritis involving the peripheral joints. This had begun at the age of 19 years. There was no history of convulsions and skull X-ray films showed no intracerebral calcifications.

### Case 11

A 17-year-old white boy had had poor vision in his left eye as long as he could remember and the eye was noted to turn out at the age of one or two years. At the age of 14 years, the vision in the right eye became seriously impaired and he depended on his left eye afterwards. Two months prior to my examination, the vision in the left eye became blurred and he was treated with typhoid vaccine intravenously.

When first seen by me, visual acuity on the right was hand movements only, that on the left 20/100 correctible to 20/70. In the right eye, the cornea was clear. The iris and pupil were normal. There was a small posterior capsular cataract. The vitreous contained numerous floating opacities. The nervehead and retinal vessels were normal. There was a very large, inactive, central chorioretinal lesion (fig. 5-e) and other smaller healed scars scattered about the periphery.

On the left, numerous fresh mutton-fat deposits dotted the posterior surface of the cornea. Only an occasional cell could be seen in the aqueous. There were large exudates floating in the vitreous. A large, pigmented, central retinal scar (fig. 5-f) showed no sign of activity and the peripheral fundus was normal. The site of the active inflammation could not be determined.

Skull X-ray studies in this case showed no intracerebral calcifications. There was no history of convulsions. Mentality seemed normal. The patient was an inmate in a reform school. Skin test for toxoplasmosis was positive. Dye test was positive 1:256. The mother's dye test was positive in the same dilution. A course of pyrimethamine (75 mg. daily) and sulfadiazine (4.0 gm. daily) was discontinued after two weeks because of a fall in the white blood count. Signs of a low-grade uveitis continued in the left eye.

### Case 12

A 31-year-old white man had had poor vision in his left eye all his life and the eye had always turned out. At the age of 18 years, he developed an active inflammation in the right eye which lasted two years and was treated by desensitization with tuberculin. Several weeks prior to my examination, inflammation recurred in the right eye and was treated with antibiotics elsewhere.

When first seen by me, the vitreous in the right eye was filled with exudate through which could be seen a fresh, active lesion and an old chorioretinal scar—both in the nasal periphery of the fundus (fig. 6-a). In the left eye, the media were clear. A very large central retinal scar (fig. 6-b) was accompanied by a second, smaller healed lesion in the nasal midperiphery and a decided optic atrophy. The skin test for toxoplasmosis was doubtful. The dye test was positive 1:1,024. The patient's mother was dead. As in Case 15 to follow, the ocular inflammation in this patient was central in one eye and peripheral in the other.

### Case 13

A white man, aged 41 years, had had poor vision in his left eye since childhood. He blamed this on an injury which took place when he was six or seven years old. He had no trouble with the right eye until he was 17 years of age at which time he developed a chorioretinitis and lost all useful vision on that side. Eye examination at that time showed an inactive central chorioretinitis in the left eye. There were seen also several smaller scattered lesions in the periphery of the left fundus. In the acutely inflamed right eye, it was thought that an active inflammation was going on in the upper, outer quadrant of the fundus. Afterward, he depended on his left eye but in recent years had had recurrent attacks of redness of the eye and blurred vision.

My examination showed an atrophic right eye with seclusion of the pupil and cataract. On the left, there were seen a few fresh mutton-fat keratic precipitates, an occasional cell in the aqueous, a developing cataract of the complicata type, a large

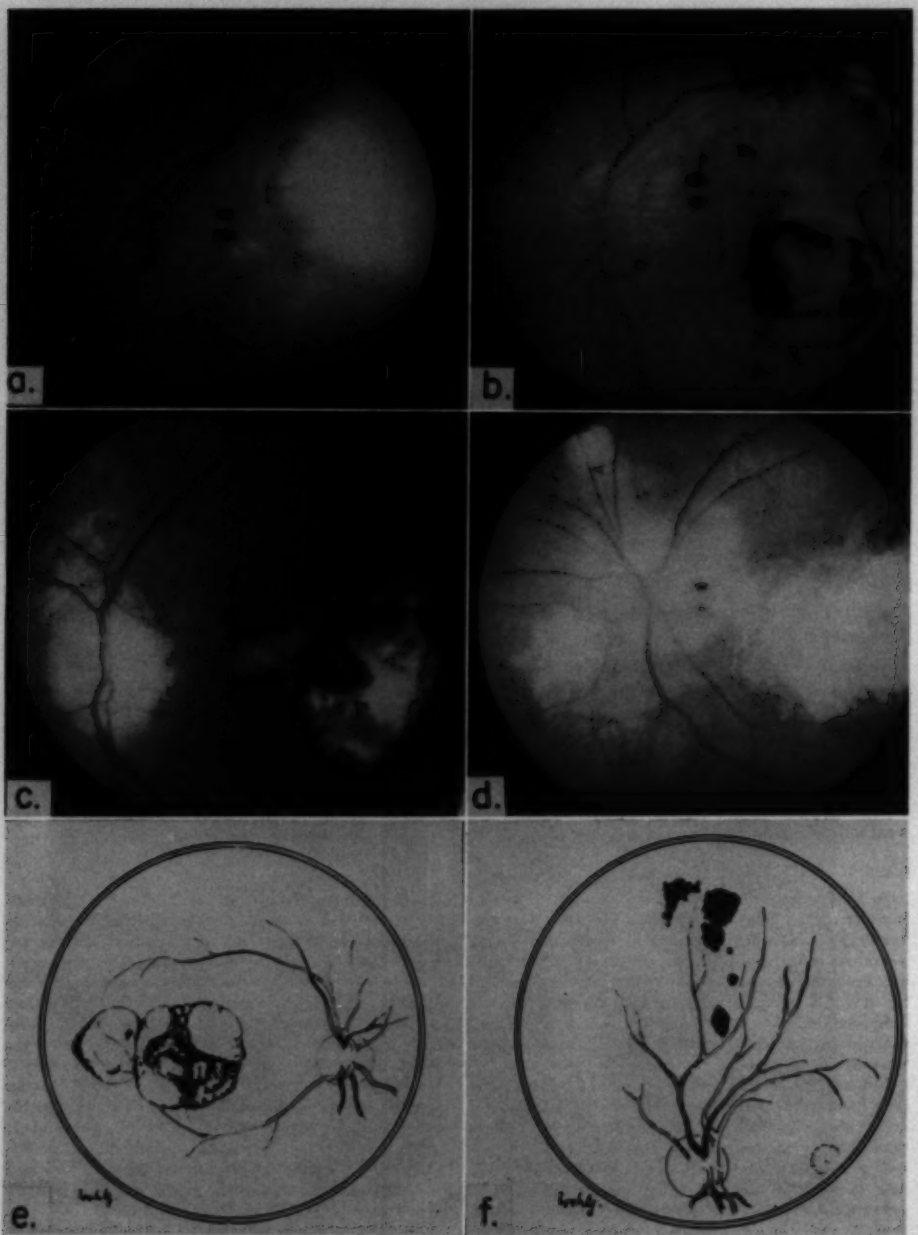


Fig. 6 (Fair). Chorioretinitis suggesting congenital toxoplasmosis. (a) Periphery of right fundus, Case 12. (b) Left eye, Case 12. (c) Left eye, Case 13. (d) Left eye, Case 14. (e) Right eye, Case 15. (f) Left eye, Case 15.

central chorioretinal scar (fig. 6-c) which showed no sign of activity, and the peripheral lesions described years before.

The skin test for toxoplasmosis was doubtful and dye test was positive 1:64. The mother's dye test was positive 1:256.

In this case, because of the scattered peripheral lesions in the left fundus and because of the recurrence of the inflammation, it is probable that the large central lesion was not traumatic as claimed but, instead, was inflammatory and congenital in origin. There was no history of convulsive seizures except that on one occasion in childhood a convulsion took place during a whipping. Skull X-ray films showed no intracerebral calcifications. Mentality was normal.

CASE 14

A 29-year-old white man had had very poor vision in his left eye all his life. He had no trouble with the right eye but, in 1952, was discharged from the Army after only 41 days of service because of "scars" in each eye.

A few months later he noticed floating spots in front of his right eye for the first time. Early in 1957, the vision in his right eye became blurred and distorted. Visual acuity was recorded as: R.E., 20/40; L.E., 3/200. Each eye was normal externally. Strings of floating exudate were seen in the vitreous bilaterally. There was a pallor of the right nervehead. Scattered about the posterior pole on the right were several small, healed chorioretinal lesions and just temporal to the macula was an elevated active process which accounted for the distortion of vision. These lesions were too indistinct to photograph well. On the left, a tremendous healed central chorioretinitis explained the poverty of vision on that side (fig. 6-d).

The skin test for toxoplasmosis was one-plus or doubtful. Dye test was positive 1:64. The mother's dye test was positive 1:256. There was no history of convulsive seizures and skull X-ray films showed no intracerebral calcifications. Mentality was normal. Although the inflammatory process seemed to be subsiding, a one month's course of pyrimethamine and sulfadiazine was prescribed.

CASE 15

A 22-year-old white soldier was seen in Germany in 1954. The vision in his right eye had always been very poor. On one occasion, a year or two before, he had noticed spots floating in front of the left eye. These cleared but recurred along with blurring of vision on the left which brought about his hospitalization.

In his right eye, there was found a very large, healed central chorioretinal scar (fig. 6-e). On the left, an active uveitis was present as manifested by fresh mutton-fat keratic precipitates and cells in the aqueous. The lens and vitreous were clear. The nervehead and central retinal vessels were normal. In the upper periphery of the left fundus were seen several heavily pigmented chorioretinal lesions (fig. 6-f) none of which showed any sign of activity. The location of the active inflammation was not determined. Skull X-ray films showed no intracerebral calcifications. There was no history of convulsions. Mentality was normal.

The skin test for toxoplasmosis was positive. The dye test was positive 1:1,024. No effort was made to locate the patient's mother.

CASE 16

A 38-year-old white woman had had poor vision and "dancing" eyes all her life. It was known immediately after birth that something was the matter with her eyes. She was born prematurely at home, was cyanotic, and afterward was a feeding problem. Early development was normal according to her mother. During the second and third summers of her life she suffered "colitis."

Eye examination showed a coarse ocular type nystagmus and internal squint. Visual acuity was uncorrectible beyond 10/200 on the right and 20/200 on the left. In each eye, the media were clear. Each nervehead was quite pale. The retinal vessels were normal. In the central retina bilaterally there was a tremendous healed chorioretinal scar. In addition, smaller lesions were seen scattered about the periphery of each fundus. Photography was impossible because of the uncontrollable eye movements.

The skin test for toxoplasmosis was positive. The dye test was positive 1:1,024. The mother's dye test was positive 1:1,024. There was no history of convulsions and skull X-ray films showed no intracerebral calcifications. Mentality was low normal in my opinion.

CASE 17

A 19-year-old Negress had had poor vision in each eye as long as she could remember. Routine prenatal examination revealed in the central area of each retina a round, deeply pigmented scar (figs. 7-a and 7-b) along with several smaller similar lesions in the periphery of each fundus. Visual acuity was 20/80, O.U., uncorrectible. The eyes were straight. There was no history of eye inflammation in the past. Convulsive seizures were denied and skull X-ray films showed no intracerebral calcifications. Mentality was normal.

The skin test for toxoplasmosis was mildly positive. Dye test was positive 1:256. The mother's dye test was positive 1:64.

CASE 18

A 32-year-old white woman remembered seeing spots before one eye at the age of seven years following an attack of pneumonia. She had no trouble then until the age of 22 years when she saw spots again for only a day or two. Two years later she developed blurred vision in one eye and saw many

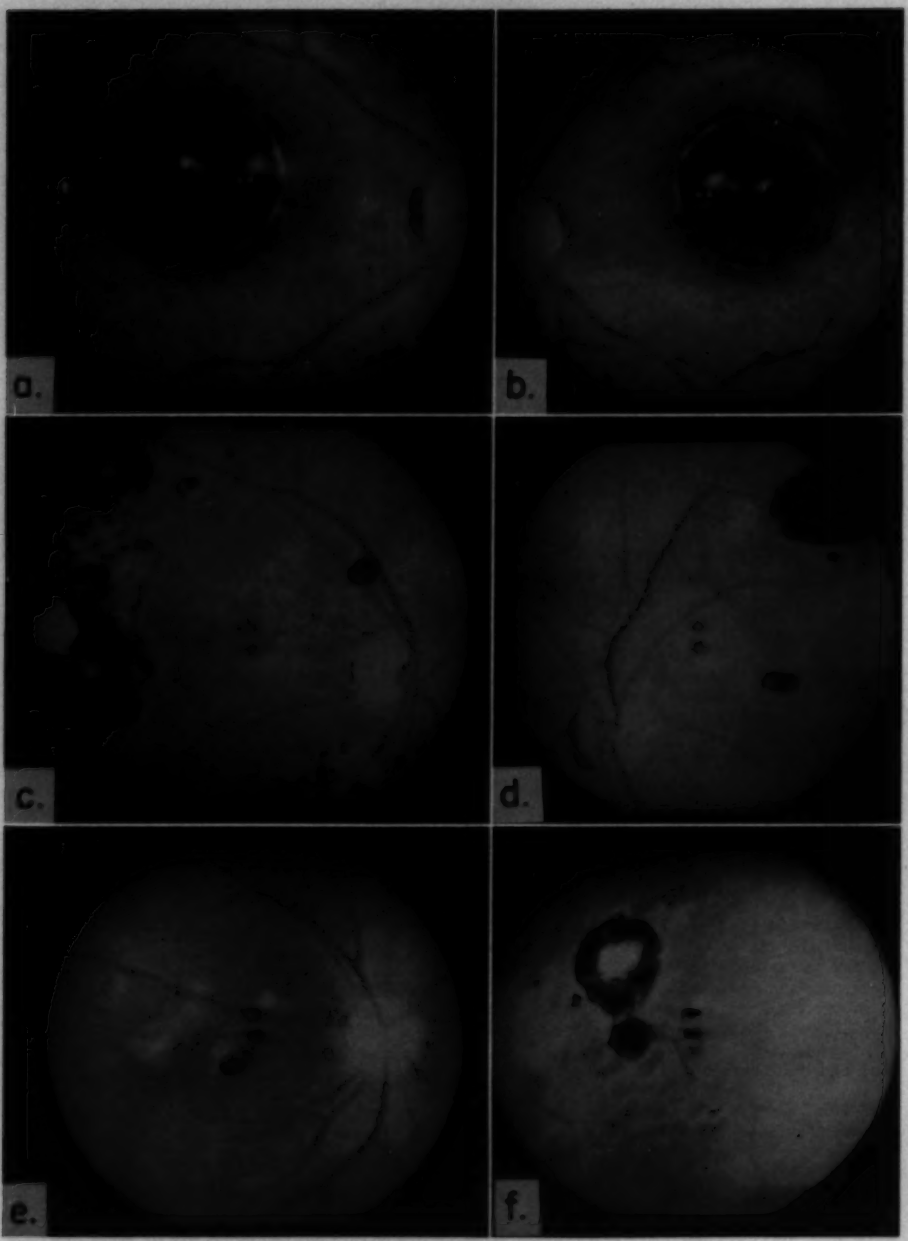


Fig. 7 (Fair). Chorioretinitis suggesting congenital toxoplasmosis. (a) Right eye, Case 17. (b) Left eye, Case 17. (c) Right eye, Case 18. (d) Left eye, Case 18. (e) Right eye, Case 19. (f) Periphery of left fundus, Case 19.

spots. Her vision gradually cleared but several months later the blurring of vision recurred and lasted several months. She had had no difficulty in the eight years that followed. Birth and development were normal. There was no past history of serious disease except for the pneumonia at the age of seven years.

Examination showed several floating opacities in the vitreous of each eye. On the right, the nerve-head was slightly pale. Alongside the disc and scattered about the posterior pole were large areas of healed chorioretinitis (fig. 7-c). In the left eye, small healed lesions were seen in and below the macula (fig. 7-d). Mentality was normal. There was no history of convulsions and skull X-ray studies showed no intracerebral calcifications.

The skin test for toxoplasmosis was strongly positive. The dye test was positive 1:1,024. The mother's skin and dye test were negative. The mother in this case is the only mother of all of those available for testing who showed no serologic evidence of toxoplasmosis. A discussion of the significance of this discrepancy is to follow.

CASE 19

A 29-year-old medical student was seen during a routine refraction. Vision was uncorrectible beyond 20/30 on the right and 20/50 — 1 on the left. Funduscopic examination showed a slight disturbance in the central retina of each eye and scattered about the periphery of each fundus were several small healed inflammatory lesions (figs. 7-e and 7-f). There was no history of eye inflammation in the past but vision had always been slightly subnormal even with the proper glasses. Convulsive seizures were denied and skull X-ray films showed no intracerebral calcifications.

The skin test for toxoplasmosis was mildly positive. The dye test was positive 1:256. The mother's dye test was positive 1:64.

Cases 9 through 19 are considered to be most convincing examples of congenital ocular toxoplasmosis because of the life-long histories of visual disturbance, their bilaterality, the tendency toward involvement of the macula, and the frequent recurrences of inflammation. The following 10 cases are thought also to be due to congenital toxoplasmosis, but are being listed separately because the histories as to duration are less reliable or because only one eye is affected or because the inflammation is not central in location. No one of them could be said for certain to be toxoplasmic in origin, but they are so similar clinically and serologic tests for toxoplasmosis are so consistently positive in patients and all mothers available for testing that, again, there must be some connection between congenital toxoplasmosis and this particular type of eye inflammation, especially when it is remembered that no comparable cases have been seen in which serologic evidence of past or persistent toxoplasmosis was lacking.

CASE 20

A 34-year-old white man had had no trouble with either eye until 16 years of age, when the vision in his right eye began to fail. This continued gradually and he had to start using his left eye to sight a rifle. There was no history of injury to either eye. General health had been good.

On examination, visual acuity in the right eye was 1/200. The media were clear and the nerve-head normal. A large retinal scar occupied the macular region (fig. 8-a). Choroidal vessels were still present in the affected area. The peripheral retina was normal. The left eye was normal in all respects.

The skin test for toxoplasmosis was positive. The dye test was positive 1:256. The mother was not available for testing. There was no history of convulsive seizures and skull X-ray films showed no intracerebral calcifications. Mentality was normal. Despite the history in this case, I believe that the chorioretinitis was congenital in origin and that recurrence of the inflammation or gradual deterioration of the retina explains the late loss of vision.

CASE 21

A 48-year-old Negress, referred for funduscopic examination because of essential hypertension, was aware of the fact that the vision in her right eye had never been quite as good as that in her left. Uncorrected visual acuity was recorded as: R.E., 20/50; L.E., 20/25. Funduscopic examination showed a single, heavily pigmented lesion in the central retina of the right eye which suggested a healed inflammatory process (fig. 8-b). There were no peripheral scars in the right fundus and the left eye was normal in all respects.

The skin test for toxoplasmosis was strongly positive and the dye test was positive 1:1,024. There was no history of convulsions and skull X-ray films, showed no intracerebral calcifications. Mentality seemed normal. The patient's mother was dead.

CASE 22

A 57-year-old white man had had poor vision in his left eye as long as he could remember. When his right eye began to fail, there was found a posterior capsular and subcapsular cataract in each eye, much more advanced on the right. The right fundus was normal. On the left there was seen a pigmented central lesion which suggested an old inflammation (fig. 8-c). The skin test for toxoplasmosis was strongly positive and the dye test was positive 1:1,024. There was no history of convulsive seizures

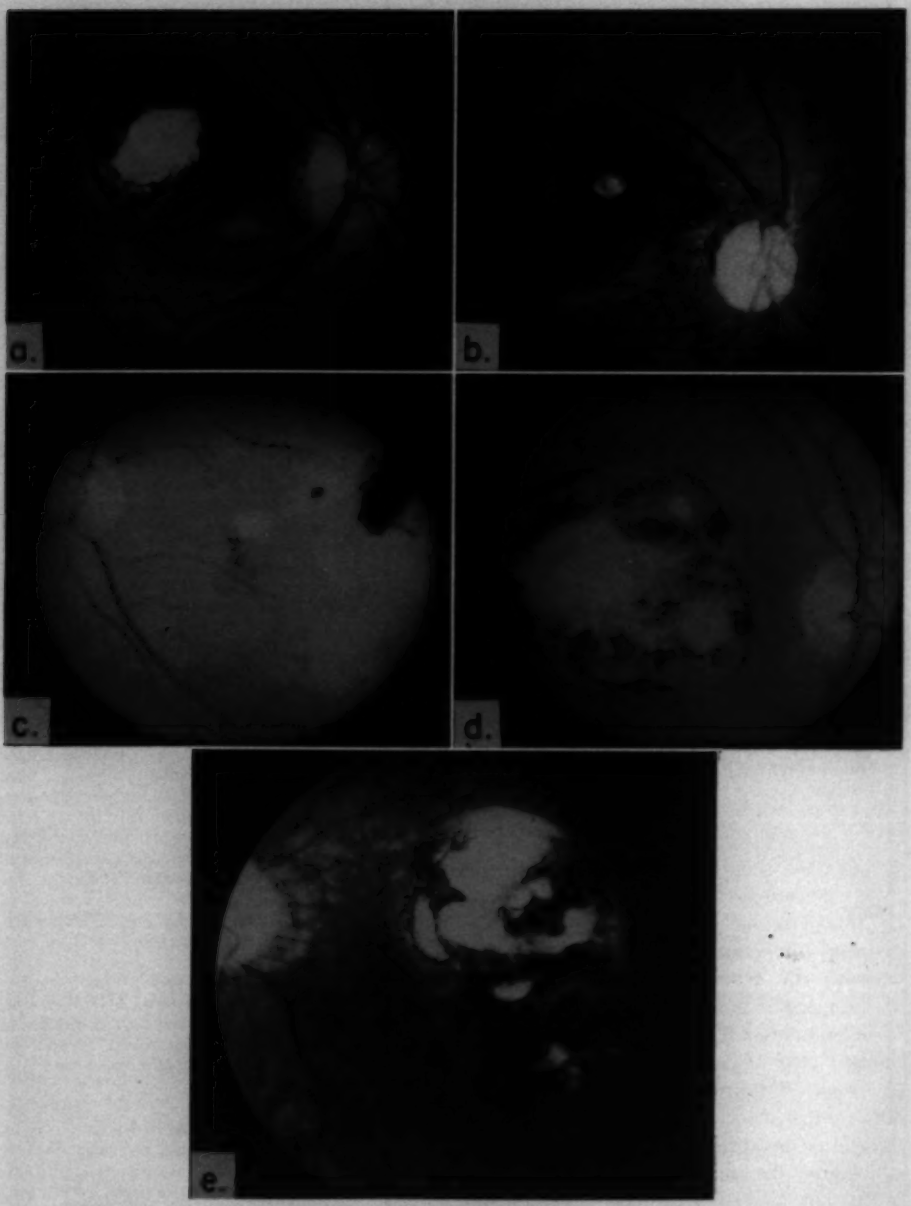


Fig. 8 (Fair). Chorioretinitis suggesting congenital toxoplasmosis. (a) Right eye, Case 20. (b) Right eye, Case 21. (c) Left eye, Case 22. (d) Right eye, Case 23. (e) Left eye, Case 24.

and skull X-ray films showed no intracerebral calcifications. Mentality was normal. The patient's mother was dead.

CASE 23

A 36-year-old white man was supposed to have seen well with each eye until only two years prior to examination but was told when he was 16 years of age that there was a "spot" in the back of his right eye. Apparently he had an active inflammation in the right eye at that time because the vision was temporarily decreased.

When seen by me, visual acuity was limited on the right to counting fingers at 24 inches. Vision on the left was normal. Each eye was normal externally and the media were clear. In the central retina on the right was a tremendous healed inflammatory process which accounted for the poor vision of that side (fig. 8-d). The peripheral retina was normal. On the left, the fundus was normal except for a faint disturbance in the nasal midperiphery which might or might not have been inflammatory in origin.

The skin test for toxoplasmosis was positive and the dye test was positive 1:128. The mother's dye test was positive 1:8. The patient's birth was a difficult one but resuscitation was not required. General health had always been good except for pneumonia at the age of seven years. There was no history of convulsions. Skull X-ray films showed no intracerebral calcifications but were poor in quality. Mentality was normal.

CASE 24

A 65-year-old white man had had poor vision all his life and his eyes had always "danced." He had never seen anything with the right eye and this eye was removed at age 30 because of a "growth." There had been no change in what he could see with the left eye at any time.

On examination, the right eye was missing. On the left, there was a fine nystagmus. Vision was 5/200, uncorrectible. The anterior segment was normal. Several strings and small blobs of exudate were seen floating in the vitreous. The nervehead and retinal vessels were normal. A large chorioretinal scar occupied the macular region (fig. 8-e). This was obviously inflammatory in origin but showed no sign of activity. There were no visible peripheral lesions in this eye.

The skin test for toxoplasmosis was positive and the dye test was positive 1:256. There was no history of convulsions and skull X-ray films showed no intracerebral calcifications. Mentality was borderline. The mother had died years before.

CASE 25

A 63-year-old white woman, hospitalized because of cerebral and coronary artery thrombosis, was seen because of a life-long history of poor vision in the left eye.

Examination was limited to what could be done at the bedside. The eyes were normal outwardly. On the right, the media were clear and the fundus normal. On the left, the media were clear. The nervehead and retinal vessels were normal. In the central retina was seen a large heavily pigmented healed inflammatory lesion.

The dye test was positive 1:256. Fundus photography was impossible because of the patient's state of consciousness. Skull X-ray films were not obtained. There was no history of convulsions. The mother was dead.

CASE 26

A 36-year-old white man had had poor vision and "jerking" eyes all his life. The right eye was always smaller than the left, never had seen more than light, and was removed at the age of 20 years with the explanation that it might affect the other eye. No pathologic examination of the enucleated eye was made. The physician who removed the eye reported that the globe "was soft and shrunken and appeared to have had a chronic uveitis."

The vision in the left eye was never better than 20/40 with correction and failed further beginning at the age of 34 years.

On examination, the right eye was missing. There was a coarse ocular type nystagmus of the left eye. The cornea was clear, the iris and pupil normal, and the anterior chamber of normal depth. The chamber angle contained what were considered to be remnants of embryonic tissue. There were no signs of inflammation, past or present. An advanced sclerosis of the nucleus of the lens was noted. Vision was correctible to 20/200 with −14D. sph.

The vitreous was clear and the nervehead and retinal vessels were normal as was the central retina. In the lower temporal midperiphery of the fundus were several small (0.5 disc diameter in size) healed chorioretinal scars. Fundus photography was impossible because of the lens changes and the peripheral location of the retinal lesions. The dye test for toxoplasmosis was positive 1:1,024. There had never been any convulsive seizures. General health had always been good. Skull X-ray films showed no intracerebral calcifications. Mentality was normal. The patient's mother was dead.

CASE 27

A 37-year-old white man was seen in consultation during his hospitalization for hypertension and thrombosis of a branch of the left middle cerebral artery. He has never had any trouble with either eye.

Uncorrected visual acuity was: R.E., 20/30; L.E., 20/80. External examination revealed no abnormality. Prominent vitreous floaters were present bilaterally. In the upper near periphery of the right eye there was a very large healed chorioretinal scar (fig. 9-a). On the left, there was a similar inactive inflammatory process in the upper nasal midperiphery (fig. 9-b). The central retina was normal in each eye.

The skin test for toxoplasmosis was positive and the dye test was positive 1:256. The mother's dye test was positive 1:256. The patient had never had any convulsions and skull X-ray studies showed no

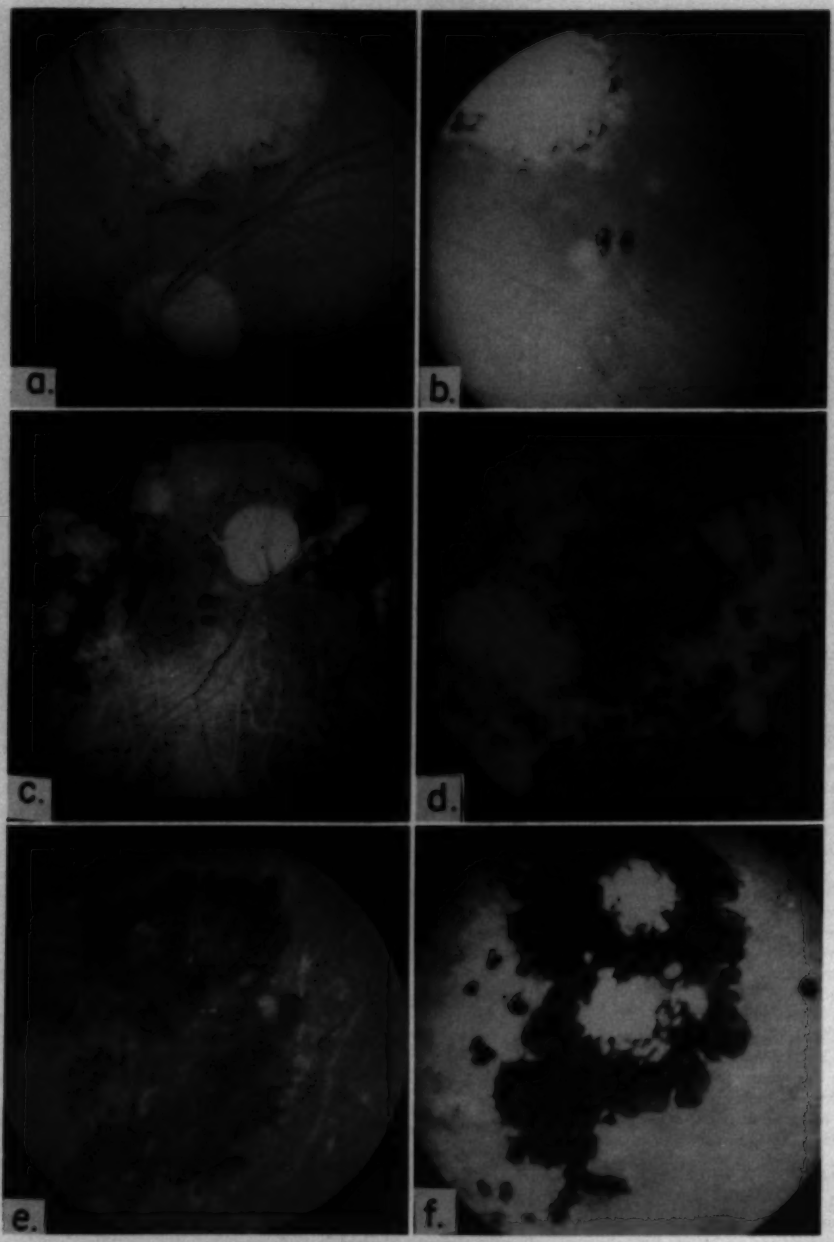


Fig. 9 (Fair). Chorioretinitis suggesting congenital toxoplasmosis. (a) Right eye, Case 27. (b) Left eye, Case 27. (c) Right eye, Case 28. (d) Left eye, Case 28. (e) Periphery of right fundus, Case 29. (f) Periphery of left fundus, Case 29.

intracerebral calcifications. Mentality was normal. This case and Case 29 are offered as examples of bilateral peripheral chorioretinitis present since birth with positive serologic tests in both patient and mother.

CASE 28

A 58-year-old Negress was seen in consultation during her hospitalization for a gall bladder disorder. According to the history (which was most unreliable), she had had no eye trouble until she was 33 years of age when she developed high blood pressure and swollen ankles during a pregnancy and went blind over night. The right eye remained blind and the left eye recovered only light perception.

Externally, there was found only an exotropia. The media were clear. Each nervehead was very pale and was surrounded by large pigmented chorioretinal scars (figs. 9-c and 9-d). There remained only a temporal island of vision in the left eye.

The skin test for toxoplasmosis was negative. The dye test was positive 1:64. There was no history of convulsions. Skull X-ray films were not obtained. Blood pressure was 135/90 mm. Hg. Mentality seemed normal. The patient's mother had died of a stroke years before.

Of all those being presented as possible examples of congenital toxoplasmosis, this case seems the least likely, but the patient's obviously poor powers of observation, the appearance of the fundi, the bilaterality of the lesion, the positive dye test, and the lack of any other apparent cause make its inclusion necessary.

CASE 29

A 44-year-old Negress had had trouble with her eyes as long as she could remember. As a child, she suffered sensitivity to light and tearing. At about the age of 36 years, she lost the vision in her left eye completely. Within three months, the vision returned, but she continued to see spots before the left eye. Uncorrected visual acuity was recorded as: R.E., 20/30; L.E., 20/70.

External examination revealed nothing abnormal. Each lens was clear. One large floating opacity was noted in the anterior vitreous on the right. In the temporal midperiphery of the right fundus was a large healed chorioretinal scar (fig. 9-e) and scattered about the posterior pole were several smaller lesions including one just below the macula. On the left, down and in from the disc, was a tremendous healed inflammatory process (fig. 9-f). There was also a small pigmented central retinal scar in this eye and several peripheral lesions.

The skin test for toxoplasmosis was strongly positive and the dye test was positive 1:1,024. The mother's dye test was positive 1:256. The patient had never had any convulsions. Skull X-ray films showed no intracerebral calcifications. Mentality was normal.

## DISCUSSION

The development of the concept of ocular toxoplasmosis has been marked by several notable advances separated by periods of indecision and even disillusionment. Proof that Toxoplasma might cause ocular inflammation in congenitally infected infants (Wolf, Cowan, and Paige, 1939) was followed by attempts to link the parasite with inflammations of the inner eye seen in older children and adults. Our early enthusiasm was quenched by the frequency of past or persistent infection in the general population as evidenced by the prevalence of positive serologic tests.

So the matter stood until Wilder's 1952 description of parasites resembling Toxoplasma in adult eyes enucleated because of chronic inflammatory disease. Strong confirmation was the isolation of the organism from an eye in an adult case of chronic chorioretinitis (Jacobs, Fair, and Bickerton, 1954). The expectation that the parasite would be recovered from additional material obtained at operation has not been realized except that Hogan (1957) was able to isolate Toxoplasma from the eye in a case of congenital toxoplasmosis of 20 years' duration.

In the individual case of chorioretinitis, there is, as yet, no sound basis for evaluating positive immunologic or serologic findings. A profitable maneuver may be a return to the starting point—congenital toxoplasmosis—for a reappraisal of the situation. The conclusions of the present study suggest that further investigation of the congenital disease may provide a new approach to some of the problems that have proved insoluble in the past.

There is the impression that congenital toxoplasmosis is a relatively uncommon disease. Cases are recognized usually in larger centers by those who are especially interested. Still, hundreds of examples are on record despite the severe diagnostic criteria employed. Heretofore, one hestitated to make the diagnosis except in the case of the complete syndrome. Many instances of the disease must go unrecognized because of the lack of one or more of the clinical features

ascribed to the classical form of the infection. As pointed out in the introduction, the presence or absence of hydrocephalus, microcephaly, mental retardation, convulsions, and intracerebral calcification depends upon the location and extent of central nervous system involvement.

On the basis of both individual and group findings, I accept the first eight cases of this study as straight-forward examples of congenital toxoplasmosis. Yet, considerable variation occurred among them—from Case 3, a complete mental and physical invalid with all the classical features of the disease, to Case 8 with only bilateral central chorioretinitis and mental retardation, mild in degree.

This variation in findings is a problem which will require considerable attention before the limits of the clinical syndrome can be defined. The one stable point of reference seems to be chorioretinitis. Again, this cannot be said for certain but, in my experience, there is no close correlation between positive serologic tests for toxoplasmosis and any of the above-mentioned signs except for chorioretinitis. That is, one sees children with convulsive disorders or hydrocephalus or mental retardation without serologic evidence of toxoplasmosis, but all children (and adults) with central chorioretinitis have significantly high dye test antibody titers, whether or not other signs of congenital toxoplasmosis are present.

If one agrees to this process of reasoning, then the number of acceptable cases of congenital toxoplasmosis will grow. For example, Cases 4, 5, and 8 were found in a recent survey of a state institution for mentally retarded children using the skin test and ophthalmoscope. Toxoplasmosis had not been considered in these patients because some of the classical features of the disease were missing. Case 4 had no convulsions, Case 5 showed no intracerebral calcifications, and Case 8 had neither convulsions nor calcifications.

If the presence or absence of chorioretinitis is important in the diagnosis of toxoplasmosis, then just as important is the ability of the examiner to detect the ocular involvement. Familiarity with the use of the ophthalmoscope is not universal among other specialists. Indeed, interpretation of what can be seen in the wildly oscillating eyes of a mentally retarded child with squint and ocular nystagmus calls for all the patience and skill of the most experienced ophthalmologist. The least that can be done by pediatricians and others responsible for this type of case is a real attempt to visualize the fundi through the widely dilated pupils. Unsatisfactory results should be followed by referral to the oculist.

It is my belief, as stated, that chorioretinitis—typically bilateral and central—is the most reliable sign of congenital toxoplasmosis and that it may be the *only* sign of the disease. Further, cases of life-long central chorioretinitis are seen so frequently and are so constantly attended by positive skin and dye tests that I believe that the *commonest* form of congenital toxoplasmosis is that in which only the eyes are involved.

This thought was expressed recently by Hogan (1957), when he reported a series of 36 cases of congenital toxoplasmosis. All had ocular signs, but in 21 of the 36, no intracerebral calcifications were seen on X-ray films. Hogan classes these cases as "inapparent" because it is not until months or years after birth that an ocular defect, the only sign of toxoplasmosis, is discovered.

I should prefer to reserve the term "inapparent" for those situations in which no clinical sign of the disease, ocular or otherwise, is ever made out. Such an entity has never been described but can be predicted certainly enough. At any rate, if it can be shown that the life-long central chorioretinitis of children and adults so familiar to the ophthalmologist is a manifestation of congenital toxoplasmosis, then this disease is not rare at all but, instead, is so common

as to constitute a public health problem worthy of real concern.

Considerable variation in the eye findings themselves is evident in Cases 1 through 8. Three of these showed the bilateral central chorioretinitis considered typical. Poor central vision, nystagmus, and squint were the natural accompaniments. One case showed extreme microphthalmos in one eye and a central chorioretinitis in the other. A mild degree of microphthalmos and healed peripheral chorioretinitis in one eye only was found in one instance. Other unilateral lesions were central chorioretinitis in one case and peripheral chorioretinitis in two others to complete the list. Use will be made of these broad differences in discussing the 21 cases in which only ocular involvement was present.

Cases 9 through 19 were presented as examples of congenital toxoplasmosis with ocular signs as the only clinical manifestation of the disease. This does not mean that the central nervous system and extraneural tissues were not involved in the prenatal infection but only that no sign of such involvement was clinically demonstrable. If a meningo-encephalitis was part of the prenatal inflammation, it was not severe enough to produce the calcifications, the mental retardation, and blockage of the aqueduct which we associate with the syndrome as it was orginally described. But even a mild infection leaves unmistakable ocular signs and symptoms. A small disturbance in the macula interferes seriously with vision and the scars left by inflammation confined to the periphery are easily recognized with the ophthalmoscope. In this connection, a local recurrence of the inflammation in brain or extraneural tissue would be likely to pass unnoticed unless marked in degree of severity, whereas even a minor flare-up in the retina is immediately called to the attention of patient and physician because of disturbance in vision.

The evidence in favor of a diagnosis of congenital toxoplasmosis in Cases 9 through 19 may be arranged in order of importance as follows:

1. Serologic

Each of these 11 cases gave a positive serologic test for toxoplasmosis, an unlikely circumstance unless there was some connection between the eye findings and toxoplasmosis. Just as important is the fact that similar lesions have not been observed in the eyes of patients with negative dye tests. In addition, in eight cases the mothers were available for study and in all but one the dye test was positive. This fact points strongly to a congenital origin of the toxoplasmosis.

2. Historical

In 10 of the 11 cases there is reliable evidence of the congenital nature of the eye ailments. Life-long poor vision, ocular nystagmus, microphthalmos, high myopia, and squint are ocular signs that point toward prenatal involvement.

3. Clinical

This aspect may be summed up by comparing the eye lesions in Cases 9 through 19 with those in proved congenital toxoplasmosis. There is the same bilaterality of involvement, the same pigment-ringed, deep, central chorioretinal scars with the scattered peripheral lesions so characteristic of obvious cases of congenital toxoplasmosis such as the first eight of this series. The tendency toward recurrence is quite typical. Hogan's isolation of Toxoplasma from the eye of a case of congenital toxoplasmosis of 20 years' duration demonstrates the ability of the parasite to persist in ocular tissues.

The one defect in the argument is the negative dye test in the mother of Case 18. Several explanations may be considered. There was no question as to the relationship of the two subjects. This leaves the possibilities that (1) the ocular inflammation was not toxoplasmic at all: (2) the inflammation was due to acquired rather than congenital toxoplasmosis; (3) the mother's dye test had reverted to negative.

The history and findings in the patient certainly suggested toxoplasmosis. Recurrence of the inflammation on several occasions beginning at the age of nine years, the bilaterality of involvement, and the appearance of the fundi are considered characteristic. The positive skin and dye tests support this impression so that nothing but toxoplasmosis seems likely as a cause.

If the eye inflammation in this particular case is due to toxoplasmosis, it is much more likely to be congenital than acquired because of the long history and because ocular involvement in acquired toxoplasmosis is unusual even in children.

To illustrate this last point, I should like to cite the case of a six-year-old Negro child referred to me because of the X-ray finding of intracerebral calcification. Birth and early development were normal according to the mother. At the age of nine months, the child developed a severe cold and within a few days became comatose. She was taken daily to a physician who gave her injections of penicillin. The acute illness subsided after a week, but a right hemiparesis remained and mental development thereafter was retarded.

At six years of age, she was unable to talk and suffered convulsive seizures. Investigation of the convulsions revealed a single intracerebral calcification. The skin test for toxoplasmosis was positive and the dye test was reported as positive in a dilution of 1:256. Funduscopic examination with the child heavily sedated and the pupils widely dilated revealed no abnormality.

This case attracted an unusual amount of attention as an example of congenital toxoplasmosis without ocular involvement until the mother's dye test was reported as negative. Now it is regarded as an acquired case illustrating the relative immunity of the eyes in this form of the disease even in the very young. Conversely, it seems that the eyes never escape the prenatal infection. This supports the belief that if the chorioretinitis in Case 18 was due to toxoplasmosis, the infection must have been congenital and not acquired in childhood.

We must consider the possibility that dye test antibodies may have disappeared from the mother's serum in the 32 years after birth of the patient in Case 18. Dye tests are known to revert to negative in pigeons after two to three years (Jacobs, 1953) and in wild rats (Eyles, 1952), although the infection persisted in the brains of the animals tested. Why the same strain of parasite should induce a lesser antibody response in mother than offspring would be difficult to determine. Possible considerations are failure of the infection to persist in the mother as it did in the patient, reinfection of the patient, and variation in the reaction of the host to the parasite. Still, the mothers in some of the other cases already discussed possessed dye test antibodies in significant levels for 30 years or more and some of the patients in the group to be discussed next showed strongly positive skin and dye tests after 50 and 60 years. In the present state of our knowledge, no reliable explanation of the serologic discrepancy in Case 18 can be offered. Since it is the only weak point of its kind in the reasoning behind the presentation of these cases, it does not necessarily negate the whole theory.

Cases 20 through 29 are presented as examples of congenital toxoplasmosis limited to the eyes but could not be considered so if it were not for experience gained in connection with the study of undoubted cases of the congenital infection. All 10 of these cases and all three of the mothers available for study showed positive tests for toxoplasmosis, a situation which we recognize as a very unlikely possibility unless there was some etiologic relationship between toxoplasmosis and the eye findings. Again, no similar cases have been seen in which serologic evidence of toxoplasmosis was lacking. In some of these cases, history as to duration is uncertain. In others, the eye involvement is unilateral and in others bilateral but peripheral in location.

It has been shown in undoubted cases of congenital toxoplasmosis that ocular inflammation may be limited to one eye and that in many cases chorioretinitis may be peripheral rather than central in location. In Cases 1, 2, and 7 of this report, the eye inflammation was both unilateral and peripheral. One might expect, then, in some cases of congenital toxoplasmosis limited to the eyes that only one eye might be involved and that the inflammation might be confined to the periphery of the retina. Theoretically, there may exist cases of congenital toxoplasmosis in which the only manifestation of the disease is a healed chorioretinitis in the periphery of the fundus of one eye. To go further, if one eye may escape, both may escape to produce a case of congenital toxoplasmosis completely inapparent except for serologic signs of past infection.

Inapparent congenital toxoplasmosis may be so rare as to be unimportant from a clinical standpoint, but the idea that cases of congenital toxoplasmosis limited to the eyes are *not* rare is upheld by the findings in two recent studies by others. In a report concerned with ocular toxoplasmosis, Forbes (1957) lists 14 cases in which he felt that such a diagnosis was indicated. One of these, in a four-month-old infant with bilateral central chorioretinitis, optic atrophy, nystagmus, squint, and a dye test titer of 1:65,536, was obviously congenital in origin as pointed out by the author. Of the other 13 cases in this same series, however, 10 were in youngsters or young adults with bilateral lesions, several with long histories of "scars" or recurrent eye inflammation. These are examples of the congenital form of the disease, in my opinion.

In a study involving the use of pyrimethamine (Daraprim) in the treatment of uveitis, Perkins, Smith, and Schofield state "The typical lesion in the posterior group was an area of focal choroidoretinitis with marked vitreous haze. When the haze cleared sufficiently, it was often noted that the active lesion was sited at the periphery of an old patch of healed choroiditis." The experience of these authors is not unique.

We are equally well acquainted with eyes which show healed chorioretinal scars in the absence of any history of eye inflammation or diminished vision. Coming across the heavily pigmented site of an old inflammatory process in a patient who is completely unaware of any eye disease in the past is one of the common experiences of ophthalmic practice. In this situation, if one is careful to eliminate traumatic, developmental, and degenerative defects that resemble healed chorioretinitis, an extremely high rate of positive serologic tests for toxoplasmosis is found in the cases which remain. Characteristics of the fundus lesions which suggest congenital infection are multiple scars, bilaterality of involvement, central or paracentral location, remnants of the hyaloid system, and other defects suggestive of interference with normal development.

In the study of congenital ocular toxoplasmosis, we are afforded one advantage in being able to correlate serum findings in mother and offspring. Negative tests in the case of the mother rule out congenital disease, of course, except possibly in the event of a very old infection as in Case 18 of this series. Positive results in both patient and mother have a great deal more significance than in the patient alone. If future studies show that the fundus changes that have been described are invariably associated with positive serologic tests in both patient and mother, then an etiologic relationship may be assumed even in the absence of the other signs of congenital toxoplasmosis.

Because the study of the common inflammations of the inner eye has again come to an apparent standstill, I should like to suggest an approach from the direction pointed out in the preceding pages. In any consideration of ocular toxoplasmosis, we should have learned by this time to ignore those inflammations limited to the anterior segment of the globe. If other peculiar fundus

changes simulating chorioretinitis can be eliminated, we find that most of the patients presenting focal inflammation of choroid and retina show positive tests for toxoplasmosis and, of these, many will have a history or ophthalmoscopic findings indicative of long-standing disease.

The occurrence of chorioretinitis in a patient of any age who has signs of previous inflammation in one or both eyes, especially if central in location, should suggest congenital toxoplasmosis. Even in the absence of acute inflammation, the finding of the typical pigmented scars should alert one to the possibility of a congenital infection. Serologic testing of the mothers of these patients should be added to the usual investigation.

If the findings in a larger series of cases bear out the ideas being presented here, we may well assume that certain inflammations of choroid and retina previously considered to be due to acquired toxoplasmosis are in actuality only ocular manifestations of the congenital disease.

## Summary

1. Considerable variation exists in both the neurologic and ocular signs of congenital toxoplasmosis.

2. Eight more or less typical cases of congenital toxoplasmosis are described along with 21 others in which chorioretinitis is believed to be the only manifestation of the disease.

3. It is suggested that the purely ocular form is the most common variety of congenital toxoplasmosis.

4. Some cases of chorioretinitis previously thought to be due to acquired toxoplasmosis may be instances of congenital infection..

5. Congenital toxoplasmosis is not an uncommon disease by these standards. Its prevalence supports serologic evidence that toxoplasmosis is one of the most widespread infections of mankind. The specificity of present serologic methods is thereby enhanced.

6. Recognition of incomplete or exclusively ocular forms of congenital toxoplasmosis will provide additional clinical material for the study of both the congenital and the acquired disease. The serologic implications are pointed out.

7. It is recommended that serologic testing of mothers be included in the investigation of all cases of chorioretinitis in which toxoplasmosis is suspected.

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# LATE INFECTION OF FILTERING CONJUNCTIVAL SCARS*

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The term *late infection* has been defined as "the transmission across a filtering scar of septic organisms, which have obtained a foothold on the conjunctiva, and which, on passing into the interior of the globe, give rise to a more or less severe form of uveitis."[1] This definition limits our consideration, therefore, to those instances where surgical procedures or trauma have resulted in filtering conjunctival blebs. Most such scars are deliberately planned, as in the antiglaucoma operations. A certain number follow interference with perfect wound closure, such as may follow cataract extraction. The remainder follow perforating trauma.

Another limitation of the use of the term *late infection* is that the infection must be exogenous and that it must not have been related to any immediate operative trauma or infection. Usually the infection occurs months or years after successful antiglaucoma operation and results from direct introduction of a conjunctival infecting organism through a thin-walled conjunctival bleb. There is no reason, however, why a conjunctivitis occurring a week or less after obvious healing of an operative wound could not also be included under this definition if the eye has been under constant observation.

We have collected our cases of late infection over a period of 20 years from our residency, clinic, and private practice experience in order to indicate the incidence and changes in the prognosis and treatment of this condition during the period of observation. A total of 28 late infections is presented.

*From Sinai Hospital, Detroit, and Michael Reese Hospital, Chicago. Presented at the annual clinic day, Kresge Eye Institute, September 16, 1957.

## CASE HISTORIES

### CASE 1

M. L. E., a 61-year-old man, was treated for advanced chronic simple glaucoma by Dr. H. S. Gradle since August 31, 1923. In spite of miotics the tonometric tension remained above normal in both eyes—between 51 and 63 mm. Hg in the right eye, the eye to be considered here. In 1925 the patient was seen by Dr. Anton Elschnig who concurred with Dr. Gradle's opinion as to the advisability of surgery. On June 12, 1925, a Curran operation was performed on the right eye by Dr. Gradle without successful lowering of tension. Miotics were continued. The patient was not seen until December 12, 1933, when he complained of visual diminution at night for the past three weeks. Vision was 0.2. The visual field (3/330 white) was constricted to 10 degrees temporally and two to three degrees elsewhere. The tension was 72 mm. Hg (Gradle-Schiøtz). On December 15, 1933, an Elliot trephining operation was performed on the right eye by Dr. Gradle. The tension remained normal thereafter. The vision returned to 0.5 without visual field change.

On January 14, 1935, during Dr. Gradle's absence, the patient was seen by Dr. S. J. Meyer. He complained of redness, lacrimation, and pain in the right eye for the past two weeks. During the previous 24 hours the right vision had failed completely so that only temporal light perception was present. The right lids were red and edematous. Moderate ciliary injection was present. The trephine bleb area contained a yellowish purulent material. The cornea was slightly hazy and the anterior lens capsule was covered with a fibrinous exudate.

The patient was immediately hospitalized. Mercury oxycyanide (1:5,000) was ordered for instillation every two hours. A drop of mercurochrome (one percent) was instilled four times daily. External heat was applied for 15-minute periods at two-hour intervals with a therapeutic lamp. Fifteen million killed typhoid bacilli were injected intravenously on the first hospital day. On the next day a one mm. hypopyon was present. Thirty grains each of sodium salicylate and sodium bicarbonate were given four times daily on this day and on alternate days when typhoid vaccine was not used.

On the third hospital day 213 roentgen units of X rays (2-1/4 min., 90 k. v. p.; 5 ma. at 15 inch distance; no filter; 3 cm. field) were administered to the right eye. A second dose of 30 million killed

typhoid bacilli was injected. On the following day the hypopyon had disappeared. The anterior chamber was clearer. A third dose of typhoid vaccine (50 million) was injected on the fifth hospital day. Adrenalin packs were used daily for the next three days before discharge to tear the posterior synechias which had formed. A drop of atropine (one percent), as well as adrenalin packs were used daily for the next several days.

By the end of January, 1935, the vision had returned to 0.5 and the field to its previous extent. Both remained the same for the next two years. In January, 1937, vision of the right eye, corrected, was 0.4 and remained the same until June, 1939, when it began to decrease slowly until, in September, 1939, the vision was only light perception temporally. The tension had remained normal during the entire period. The disc showed marked glaucomatous excavation and atrophy.

Case 2 (two separate infections, one eye)

J. W., a 63-year-old, mildly diabetic man, had been treated for bilateral chronic simple glaucoma by Dr. H. S. Gradle since November, 1933. In spite of miotics the tension in the right eye remained between 26 and 40 mm. Hg (Gradle-Schiøtz). On April 27, 1934, an Elliot trephining operation was performed on the right eye by Dr. Gradle. The tonometric tension remained between 9.0 and 15 mm. Hg in the operated eye. Four months later the patient awoke one morning to find the vision in his right eye reduced to recognition of hand movements. Associated with the visual loss was a watery discharge from the eye. On examination a small rupture was found at the lowest point of the trephination bleb. A rather extensive choroidal detachment was also present. A conjunctival flap was drawn down from above and held over the scarfied upper cornea with two silk sutures. The eye returned to its previous physical state and function uneventfully. The tension remained between 11 and 20 mm. Hg. Vision stayed at 20/40.

Eleven months later, on March 30, 1937, the right conjunctiva became infected and covered with a purulent secretion. On examination the following day, the right vision was 4/200. The trephination bleb was found to be intact but infiltrated with a purulent material. The aqueous was loaded with pus cells. A fibrinous membrane filled the pupillary area. The tension was minus 2.0 mm. Hg.

The patient was immediately hopitalized and 300 roentgen units of X rays (7-2/3 minutes; 110 k. v.p.; 5 ma.; 15-inch distance; 1 mm. aluminum filter; 5 cm. field) were administered to the right eye. A drop of one-percent atropine sulfate solution three times daily as well as instillations of 1:5,000 mercury oxycyanide and one-percent mercurchrome solution four times daily were ordered. Eighteen million killed typhoid bacilli were injected intravenously.

On the second day of hospitalization a one-mm. hypopyon was visible but disappeared by the next day. Sodium salicylate (gr. 15) and sodium bicarbonate (gr. 10) were administered four times on this day and repeated on alternate days. Two more doses of typhoid vaccine, 30 and 50 million, respectively, were given on the third and fifth hospital days.

The eye improved markedly and the patient was discharged from the hospital on the sixth day. Six daily intravenous injections of 10 cc. of calcium gluconate were given as the eye slowly cleared. They were then given at longer intervals until April 24, 1937 when the eye was nearly pale. By May 23, 1937, the vision of the right eye had returned to 0.4. No cells or beam were visible.

On April 15, 1939, the patient again had a conjunctivitis with purulent material in the bleb area. On instillations of mercurochrome and mercury oxycyanide the eye cleared without intraocular involvement. The last recorded vision on July 12, 1939, was 0.4 R.E. The tonometric tension was 15 mm. Hg (Schiøtz).

Case 3

M. S., a 76-year-old feeble man, was treated with miotics for simple glaucoma by Dr. M. L. Folk at the Michael Reese Hospital Eye Clinic since December 12, 1934. Corrected vision was 10/200 in the left eye, the one to be considered here. An Elliot trephining operation was performed by Dr. Folk on February 26, 1935. Visual fields could not be taken because of lack of co-operation. The tension remained normal postoperatively.

The vision remained unaltered until January 1, 1937, when the patient was admitted because of redness, lacrimation, and pain of several days' duration. Vision was light perception with faulty projection. The left lids were swollen. There was mixed conjunctival injection and a yellowish discoloration of the trephine bleb area. The cornea was steamy. The aqueous was turbid and contained considerable fibrin. A one-mm. hypopyon was present. One drop each of one-percent atropine sulfate, one-percent neosynephrine, and one-percent mercurochrome was ordered for instillation into the left eye three times daily. External heat was applied for 20-minute periods four times daily. Calcium gluconate (gr. 60) was given orally three times daily.

On the third hospital day the hypopyon was gone and the eye slightly improved. On the fourth day 10 cc. of boiled milk were injected intramuscularly to determine tolerance to later use of typhoid. On the fifth hospital day vision was light perception with normal projection. Because of inability to see to get around, the right lens was extracted intracapsularly on January 26, 1937, by Dr. Folk. A few hours after the operation the patient developed a coronary occlusion and died four days later.

Case 4

M. S., a 66-year-old man, had an attack of acute congestive glaucoma in his left eye on August 18, 1938. He did not seek medical aid until one week later when he was seen at the Illinois Eye and Ear Infirmary on the service of Dr. L. Hoffman. An

iridectomy was done on August 27th following which the ocular hypertension recurred. Miotics were of no avail so that an Elliott trephining operation was performed, the trephination being made at the 7-o'clock limbal area. The tension remained between 21.5 and 32.5 mm. Hg (Schiøtz) with miotics thereafter. When seen in the glaucoma clinic on February 6, 1939, instillations of one-percent aqueous mercurochrome solution were ordered for the left eye three times daily to prevent infection through the trephination bleb. The patient discontinued their use after a short time because of the burning sensation they caused.

About eight weeks later, on March 31, 1939, the patient was readmitted to the hospital because of a severe iridocyclitis. The conjunctiva of the left eye was markedly injected. Frank pus was visible in the trephination bleb. The anterior chamber was collapsed. Vision was reduced to light perception and projection. The tension was 38 mm. Hg (Schiøtz). Five intravenous injections of typhoid vaccine were given, ranging from 10 to 120 million killed bacilli per dose. Heat was applied four times daily in 20-minute periods. The infection cleared but the anterior chamber remained obliterated. The lens later became cataractous and the tension rose to 65 mm. Hg. A cyclodialysis was done on June 3, 1939. The tension remained up and the chamber did not form. A left lens extraction was done on June 7th without success. Enucleation followed.

CASE 5

W. F., a 61-year-old man, had noticed visual loss in the right eye since December, 1937. He was admitted to the Illinois Eye and Ear Infirmary on the service of Dr. S. J. Meyer in October, 1938. At this time only a tiny central field of vision remained. The disc was markedly excavated. In spite of miotics, the tonometric tension remained elevated. An Elliot trephining operation was performed on this eye on October 14, 1938. The tension became normal and the patient did not return to the clinic for further checkup until May 25, 1939. Five days previously he had begun to notice redness and lacrimation of the right eye. The following morning the right lids were swollen and the eye became painful.

On admission the right vision was nil. The lids were markedly edematous. The eyeball was proptosed and fixed. The conjunctiva was red and chemotic. A yellowish purulent material filled the trephination bleb. The anterior chamber contained a thin fibrinopurulent exudate. A yellowish reflex was visible behind the lens. Treatment with atropine, heat, and antiseptics were of no avail. Evisceration was done on May 27, 1939. The trephination area was excised for sectioning (fig. 1). Culture of the purulent material gave no growth.

CASE 6

E. F., a 53-year-old woman, had had an Elliot trephining operation performed on the right eye in June 30, 1938, because of a chronic simple glaucoma which did not respond to miotics. The tension remained normal thereafter. Vision of the right eye postoperatively was 20/20 in spite of a five-degree visual field. On July 21, 1939, the patient was seen because of pain, lacrimation, and photophobia of 24 hours' duration. Vision of the right eye was 20/25. Tactile tension R.E., was soft. A small opening was present in the lower part of the yellowish trephination bleb. A beam and many cells were present in the shallow chamber and in the pupillary area. Homatropine was instilled in the eye and three doses of intravenous typhoid vaccine were given on alternate days, beginning with 20 million bacilli and increasing to 40 million. The eye quieted rapidly but many posterior synechias remained. The tension remained normal thereafter. Vision of the right eye on October 15, 1939, was 20/30. The peripheral field was unchanged.

Fig. 1 (Sugar and Zekman). Microphotographs of infected trephination area. (A) Sclera. (B) Cornea.

CASE 7

E. O., a 51-year-old man, was treated for chronic simple glaucoma at the Illinois Eye and Ear Infirmary on the service of Dr. S. J. Meyer since February 7, 1938. In spite of miotics, tension in his left eye could not be controlled, so an Elliot trephining operation was done on this eye on February 26, 1938. The tension remained normal with miotics. On June 13, 1939, while on a regular visit to the glaucoma clinic, it was noted that the left lens was subluxated and the anterior chamber contained vitreous. Vision in the left eye was 20/200 with a temporal, somewhat constricted field. The tension was 15 mm. Hg (Schiøtz). On July 3, 1939, the left eye became red and painful. Lacrimation was profuse.

When seen at the clinic two days later the left conjunctiva was markedly injected. Fibrino-purulent material could be seen in the trephine bleb. A beam and many slowly moving cells were visible in the aqueous. Several posterior synechias had

formed. Vision was finger counting at one foot. The tension was 43 mm. Hg (Schiøtz). Three intravenous injections of typhoid vaccine ranging from 30 to 75 million bacilli were given on alternate days. Following this series the patient received five intramuscular injections of boiled milk on alternate days. A slight hypopyon became visible and the eye did not improve. Three X-ray treatments totalling 320 r were then given over a period of 10 days, in three doses of three, four, and three minutes, respectively, (123 k.v.p.; 5 ma.; 15 inch distance; 2 mm. aluminum filter; 39 roentgen units per minute.) The eye slowly improved although the tension remained elevated. Miotics were continued after the eye paled and no further therapy was considered because of the lens dislocation and poor visual field.

Case 8 (both eyes)

A. H., a 62-year-old man, was treated for chronic simple glaucoma on the Findlay service of the Illinois Eye and Ear Infirmary since July, 1935. An Elliot trephining operation was done on the right eye on August 8, 1935, followed by a similar operation on the left eye four months later. On March 19, 1936, while suffering from an acute coryza, the left eye became red and painful. On the following day the left trephination bleb area became yellow.

The patient was admitted to the infirmary. Vision in the left eye was reduced to recognition of hand movements at three feet. The tension was 22 mm. Hg (Schiøtz), The left conjunctiva was markedly injected and the trephine bleb filled with pus. No perforation was found. A two-mm. hypopyon was present. Fibrin covered the pupillary area and was present in the aqueous. Instillations of two-percent homatropine, one-percent aqueous mercurochrome, and mercury oxycyanide (1:5,000) were ordered. External heat was applied with a therapeutic lamp for 20-minute periods every two hours. An intravenous injection of 15 million killed typhoid bacilli was given. On the following day the hypopyon had disappeared. Four more intravenous injections of typhoid vaccine, increasing to a maximum of 75 million bacilli, were given on alternate days. The eye cleared rapidly and the patient was discharged on April 10, 1936. The left vision returned to 20/200 but the tension remained elevated, requiring further surgery for its control.

On December 17, 1936, the right eye became red and painful. The conjunctiva was injected and the trephination bleb infiltrated. A beam and cells were visible in the anterior chamber. The patient was admitted to the infirmary where he was given three intravenous injections of typhoid vaccine. Atropine sulfate (one percent), mercurochrome (one percent), and mercury oxycyanide (1:5,000) were used by instillation. The eye cleared rapidly and the patient was discharged on December 30, 1936. Vision of the right eye returned to 20/70, the same as it had been before the infection. The tension in this eye remained normal.

Case 9 (both eyes, one twice)

B. M., a 62-year-old man, was treated for chronic simple glaucoma by Dr. S. J. Meyer since November 3, 1936. Bilateral trephining operations were performed on November 13, 1936, by Dr. Meyer at the Michael Reese Hospital.

The tension of the right eye remained normal. The vision of the right eye remained 0.5. On June 6, 1937, the eye became red and painful. Lacrimation was excessive. When seen three days later by Dr. Meyer, the eye was only moderately injected. A small hole filled with a fibrinopurulent plug was present in the thin trephination bleb. The anterior chamber was obliterated. Heat and mercurochrome instillations were used. An intravenous injection of 10 million killed typhoid bacilli was given. Two days later the chamber began to form. No cells or beam were visible. Five days after the chamber had formed the trephination bleb area was repaired by Dr. Meyer, using a Kuhnt flap drawn down from above and anchored with two black silk sutures. Vision of the right eye after healing was 0.2. The tension remained normal.

In November, 1937, the right eye was treated for an acute catarrhal conjunctivitis. A week after its onset the eye became red and painful. The patient was seen on the following day and hospitalized. The bleb area was filled with a fibrinopurulent material extending into the anterior chamber. A two-mm. hypopyon was present.

Atropine, mercurochrome (one percent) and mercury oxycyanide (1:5,000) were used by instillation. Heat was applied with a therapeutic lamp for 20-minute periods every two hours. Two intravenous injections of 15 to 25 million typhoid bacilli, respectively, were given on the first and third days of hospitalization; 125 roentgen units of X rays were administered to the right eye (110 k.v.p., 5 ma.; 15 inch distance; 1 mm. aluminum filter; 3 cm. field). On the following day the hypopyon had disappeared. Two more doses of X rays of 200 roentgen units each were given at intervals of two to three days. A culture taken from the trephine bleb area showed staphylococci and diphtheroids. The eye cleared rapidly and the patient was discharged after eight days of hospitalization.

Two days later he was readmitted with exactly the same condition in the other eye. The tactile tension was elevated. Atropine, three doses of X rays of 200, 125, and 140 roentgen units, respectively, were administered to the left eye on the first, third, and seventh days of the hospital stay. Four intravenous typhoid vaccine injections were given on alternate days, beginning with 15 million and increasing to 60 million bacilli. After 11 days of hospitalization the infection was cleared and the patient discharged. The vision remained poor in both eyes because of associated lens changes. The tactile tension on discharge was soft.

Case 10

G. S., a 71-year-old man, had had a trephining operation performed on the left eye in 1935. He was first seen in the glaucoma clinic of the Illinois Eye and Ear Infirmary on July 30, 1940. The tension of the left eye was soft and the visual acuity in this eye reduced to finger counting at two feet.

The other eye was treated with pilocarpine for early simple glaucoma. On January 14, 1941, the patient was admitted to the hospital because of redness and pain in the left eye of three days' duration. The trephination bleb was obviously infected. A two-mm. hypopyon was visible. This was treated with atropine, typhoid vaccine, and antiseptics. On January 20, 100 roentgens of X rays were administered to the left eye. The eye remained soft. On February 3, 1941, a conjunctival flap was drawn down and attached to the cornea to obliterate the bleb which was necrotic. The tension of the left eye remained within normal limits until the patient was last seen at the clinic on January 23, 1943.

CASE 11

R. N., a 47-year-old man, was first seen at the glaucoma clinic of the Illinois Eye and Ear Infirmary on January 12, 1939. The right eye had been blind for six months. Examination revealed absence of light perception. The tension was 75 mm. Hg (Schiøtz) and the chamber angle completely blocked. No other pathologic finding except excavation of the disc could be found. The other eye was entirely normal. The tension did not respond to miotic therapy. On April 29, 1940, an Elliot trephining operation was done. The anterior chamber was flat for five days. The eye was quiet until May 15th when the patient was readmitted to the hospital with purulent exudate at the trephine bleb and a one-mm. hypopyon. Treatment with atropine, sulfanilamide, and typhoid vaccine was of no avail. An evisceration was done on May 17, 1940.

CASE 12

M. L., a 40-year-old woman, had had a trephining operation on the right eye on May 18, 1939. She was first seen at the Illinois Eye and Ear Infirmary on June 27, 1939. The trephination was not functioning and the tension was not controlled in either eye. Another trephining operation was, therefore, done on the right eye on June 29, 1939.

The tension was normal until July 28, 1940, when the patient was admitted to the hospital because of pain and redness of the right eye of three days' duration. A typical late infection was present. Under therapy with atropine, adrenalin packs, typhoid vaccine, and 15 gr. of sulfanilamide four times daily the eye quieted down. The visual acuity in the right eye, which had been 20/70, was reduced to 20/100 corrected. The tension remained soft until September 21, 1940, at which time it was elevated to 63 mm. Hg (Schiøtz). On pilocarpine the tension was not controlled. The patient was last seen on October 25, 1941.

CASE 13

B. M., a 68-year-old man, had had a trephining operation in June, 1939, on the left eye at the Illinois Eye and Ear Infirmary. The tension remained between 10 and 15 mm. Hg (Schiøtz) until April 25, 1940, when he was admitted to the hospital with a typical late infection of the trephination bleb. On mercury oxycyanide atropine, typhoid vaccine, and a one-third erythema dose of X rays the infection cleared and the tension remained normal until last seen in May, 1942. The visual acuity in the left eye had been 20/200 corrected before the infection and improved to 20/70 in June, 1941.

CASE 14

S. S., a 58-year-old man, was first seen on April 11, 1953, because of decreasing vision in his left eye. His corrected visual acuity was 20/20, R.E., and 20/100, L. E., The left disc was excavated and the tension of this eye was 64 mm. Hg (Schiøtz). The visual field was reduced to 20 degrees, with involvement of the macula. The right eye was entirely normal and remained so. The left eye was treated with pilocarpine but the tension was not reduced below 36 mm. Hg. On May 7, 1953, a trephining operation was done on the left eye. On November 10, 1953, the tension was 25 mm. Hg.

The patient was next seen on July 21, 1954. He gave a history of redness and pain in the left eye of two days' duration. A late infection of the trephination bleb was present. Aureomycin, scopolamine, and cortisone were used locally. Penicillin (300,000 units) injections were given daily. Two days later the eye was well. The tension was normal and the vision was 20/100 when last seen on May 6, 1955, prior to his death.

CASE 15

L. G., a 64-year-old man, was first seen on January 24, 1952. A trephining operation had been done on the right eye in 1942 following the discovery of excavation of the right disc and a tension of 35 mm. Hg (Schiøtz). The left eye had always been normal. The right visual acuity was 20/80, corrected, and the field reduced to five degrees centrally. The tension was 10 mm. Hg, R.E., and 25 mm. Hg, L.E. (Schiøtz). On December 5, 1953, the patient was seen because of redness and pain in his right eye of one day's duration. A late infection of the trephination bleb with hypopyon was present. Terramycin ointment and cortisone locally and intramuscular penicillin were used to treatment. On December 12th, one week after onset of the infection, the eye was practically well. No hypopyon or purulent involvement of the bleb remained. On April 16, 1954, the corrected right visual acuity was 20/80. On July 2, 1955, it was reduced to 20/100 (figs. 2 to 5).

CASE 16

J. M. S., a 51-year-old man, was first seen on July 28, 1951, because of ocular irritation. His corrected visual acuity was 20/40, R.E., and 20/25, L.E. Both discs were deeply cupped. The tension was 48 mm. Hg (Schiøtz) each eye. The right visual field showed a nasal step and a reduction in the temporosuperior field. The left field was reduced to 10 degrees with macular involvement. Pilocarpine did not control the tension adequately. On August 9, 1951, a trephining operation was done on the right eye and on January 31, 1952, on the left eye. The tension remained normal.

On October 13, 1953, the patient was seen because of pain in the left eye of three days' dura-

Fig. 2 (Sugar and Zekman). *Case 15.* Appearance of infected trephination area and hypopyon on December 5, 1953.

tion. A late infection with hypopyon and posterior synechias was present. He was hospitalized and treated with penicillin and streptomycin intramuscularly, and aureomycin, atropine, and sulfacetamide locally. On the next day the anterior chamber was collapsed. Treatment was continued and the eye gradually improved in appearance. He was discharged from the hospital on October 16th and was considered cured on November 4, 1953. The visual acuity was reduced to light perception because of cataract formation. The tension remained normal.

CASE 17

I. G., a 57-year-old woman, was first seen in December, 1949, for refraction. Her corrected visual acuity was 20/20 each eye. The tension was 36 mm. Hg (Schiøtz), R. E., and 30 mm. Hg, L.E. The tension was controlled on pilocarpine until December, 1950, following which it was not controlled. The blindspot of the right eye was larger than it previously had been. An iridencleisis was performed on the right eye on July 12, 1951. The tension remained normal until May, 1952, and trephination of

Fig. 3 (Sugar and Zekman). *Case 15.* Appearance two days after onset. Hypopyon and bleb cleared.

Fig. 4 (Sugar and Zekman). *Case 15.* Appearance one week after onset.

the right eye was advised. Consultation was obtained from Dr. John Dunnington and a trephining operation was done on November 20, 1952. The tension of the left eye remained 36 mm. Hg. Trephination was advised and done on June 25, 1953. The corrected visual acuity remained 20/20 each eye and the tension remained normal.

On April 14, 1954, the patient was seen because of infection of the left trephination bleb of one day's duration. Neomycin and cortisone were used locally and achromycin and penicillin by injection (figs. 6 to 8). On April 26 the infection was cleared; the bleb was flat. On May 5, 1954, the tension in the left eye was 48 mm. Hg. Pilocarpine was ordered and stopped in August, 1954, after the tension had remained at 20 mm. Hg. The tension remained normal thereafter. On April 7, 1955, an infection of the trephination bleb in the right eye occurred. Neomycin and cortisone were used locally and penicillin by injection. The infection was cleared on April 14th (figs. 9 and 10). When last seen on March 8, 1956, the corrected visual acuity was 20/25, R.E., and 20/20 L.E. The tension and visual fields were normal.

CASE 18

C. M., a 63-year-old woman, had had a trephining operation on the right eye for simple glaucoma

Fig. 5 (Sugar and Zekman). *Case 15.* Appearance one month later.

Fig. 6 (Sugar and Zekman). *Case 17*, left eye. Infected trephination bleb of one day duration.

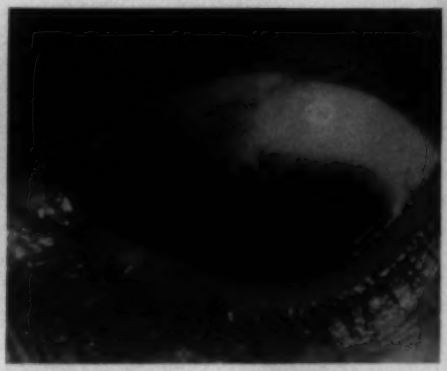

Fig. 8 (Sugar and Zekman). *Case 17*, left eye. Appearance of bleb one year later, functioning normally.

on June 8, 1956, with normalization of tension. On November 29, 1956, she was seen after having suffered a late infection in the right eye for three days. A purulent infection of the bleb, hypopyon, and pus in the vitreous were present. Treatment with penicillin injections, Neosporin drops, atropine, and subconjunctival injection of penicillin were of no avail. Evisceration was done on December 6, 1956. The culture of the globe contents showed the presence of hemolytic straphylococci (fig. 11).

CASE 19

H. B., a 64-year-old man, was first seen on September 10, 1955. He had had a trephining operation on the left eye in 1940. The vision in this eye had been reduced to light perception for two years. During the past month a late infection had occurred and a filtering bleb was present. The anterior chamber was flat. The tension was 43 mm. Hg (Schiøtz). The bleb area was injected and contained scar tissue continuing into the anterior chamber. The iris was covered with a vascular membrane which continued across the pupil to the cataractous lens. The eye continued to pale and the tension became normal. Treatment with hydrocortisone and chloromycetin locally was continued.

On January 22, 1956, the left eye suffered another episode of purulent conjunctivitis. When seen six days later, a typical late infection was present with purulent material in the bleb area. Chloromycetin, Neosporin drops, and Gantrisin and Neosporin ointments were used locally. The eye was much improved when seen one week later. It was entirely pale by March 10, 1956, and continued so until last seen on July 1, 1957.

CASE 20

W. M. C., a 49-year-old woman, complained of decreased vision of two years' duration. Ocular tension in the left eye was 35 mm. Hg (Schiøtz). On April 10, 1947, an iridencleisis was done at the Detroit Receiving Hospital but the tension remained hard thereafter in spite of subsequent cyclodialysis. On August 23rd, a typical late infection

Fig. 7 (Sugar and Zekman). *Case 17*, left eye. Appearance of bleb two weeks later.

Fig. 9 (Sugar and Zekman). *Case 17*, right eye. Infected trephination bleb on April 7, 1955.

Fig. 10 (Sugar and Zekman). *Case 17*, right eye. Appearance of bleb one day following treatment.

occurred which was treated with atropine and local penicillin and intramuscular penicillin injections. The eye cleared, although on October 6th there was still considerable inflammation. When last seen in April, 1951, the eye was phthisical.

CASE 21

M. R., a 47-year-old woman, was operated upon for a cataract of the left eye on August 14, 1952. Because of the patient's extreme nervousness, the operation was done under general anesthesia. An intracapsular round pupil operation was done. An iris prolapse occurred under the conjunctival flap, presumably following recovery from anesthesia. The eye healed well. The corrected visual acuity was 20/25, with a +12.75D. sph. ⊂ +4.25D. cyl. ax. 20°. On December 17, 1955, an exogenous infection of the prolapsed area occurred. This was treated with an ointment containing neomycin and polymyxin B, and scopolamine locally. Mysteclin was used orally. The eye was well by December 28th and the filtering cicatrix had scarred down so that it was smaller than it had been. The corrected visual acuity remained 20/25. (figs. 12 to 14).

CASE 22

O. M., a 63-year-old man, had an uneventful right intracapsular cataract extraction on July 12, 1956. The eye healed well except for a small, flap-covered iris incarceration at the temporal edge of the incision. Healing was uneventful except for the formation of a filtering scar. On August 20, 1956, an infection of the filtering scar with hypopyon occurred and cleared over a period of a week on penicillin by intramuscular injection, cortisone drops, and Polysporin ointment. The corrected acuity was 20/30. Because of persistence of the filtering scar the patient was hospitalized on December 13, 1956; the scar was excised and the scleral edges sutured. The filtering scar did not recur. The visual acuity was not impaired.

CASE 23

R. D., a 51-year-old woman, was first seen on January 23, 1957, because of blurred vision in the right eye of three months' duration. The visual acuity was reduced to finger counting, right eye, and was 20/25, left, corrected. The right pupil was five mm. in size and reacted sluggishly, while the left pupil was 2.5 mm. in size and reacted normally. Both anterior chambers were very shallow. The disc of the right eye was deeply excavated, the left moderately. The tension was: R.E., 85 mm. Hg; L.E., 58 mm. Hg (Schiøtz). A diagnosis of bilateral angle closure glaucoma was made and Diamox and Carbachol ordered. The tension was reduced to the upper limits of normal. Vision was 20/200, R.E., with plano lens; 20/20—4, L.E., with a −1.75D. sph. ⊂ +0.5D. cyl. ax. 90°. The right visual field was reduced to 30 degrees temporally, to 10 degrees in the inferior nasal quadrant, and 15 degrees in the superior nasal quadrant.

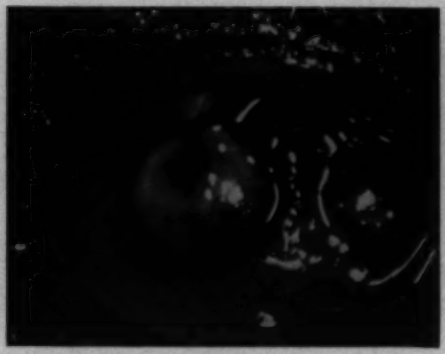

Fig. 11 (Sugar and Zekman). *Case 18*. Appearance of eye four days after onset of late infection.

Fig. 12 (Sugar and Zekman). *Case 21*. Hypopyon one day after late infection of postoperative cataract wound.

The tension did not remain controlled so on April 16, 1957, a typical iridencleisis with incarceration of the nasal pillar was done on the left eye. A similar procedure was done on the right eye two days later. Good filtering blebs with normalization of tension resulted. The corrected visual acuity was 20/300, R.E., and 20/25+3, L.E. The eye remained quiet until October 22, 1957, when a conjunctivitis occurred in the left eye. When seen three days later there was a typical late infection of the bleb with hypopyon. Treatment with Chloromycetin and hydrocortisone locally resulted in a quiet eye in two days. Complete recovery resulted in one week.

Fig. 14 (Sugar and Zekman). *Case 21.* Appearance of bleb one week later.

### Incidence of late infection

Late infection has occurred after many of the filtering operations for glaucoma, including the Elliot trephining operation, the Lagrange sclerectomy, the iris inclusion operations, and in iridectomy cases in which a filtering scar has formed. In addition, it may occur after cataract operations or other intraocular surgery where a filtering scar forms, and after traumatic wounds which are followed by such cicatrices.

We are here most concerned with the relative incidence of late infection in the two antiglaucoma operations most frequently used in the United States—trephination and iridencleisis.

From the literature, with slight additions to the data gathered by Aerola,[2] late infections have occurred in 1.7 percent of 6,051 Elliot trephinings operation (table 1). This may be compared with Dellaporta's[3] 0.3 percent incidence of late infection after iridenclesis among 2,048 cases (table 2).

Fig. 13 (Sugar and Zekman). *Case 21.* Appearance of infected bleb one day after infection.

The incidence of late infection following the Lagrange operation has been reported in few cases. Scardapane[4] found an incidence of 1.54 percent (10 cases) in the literature. Dellaporta[3] reported two cases of infection after the Lagrange sclerectomy as compared to nine following trephination.

In our own series, 24 late infections occurred following trephination in 22 eyes of 21 patients, and two followed iridencleisis. Because the number of operations done at each institution during the time concerned is difficult to determine accurately, only the incidence of cases observed in private practice during the years 1951 to 1956 will be considered. During this period 48 trephinations and 66 iridencleises were done. Of these, late infection occurred in four trephined eyes (8.3 percent) and in one in which an iridencleisis operation had been performed (1.5 percent). It is noteworthy that an infection occurred at different times in each eye of one patient following trephinations.

It may be of some interest to consider late infection in filtering cicatrices after successful cataract extraction. Two instances occurred among five eyes with obviously filtering cicatrices in a series of 500 consecutive

TABLE 1

INCIDENCE OF LATE INFECTION AFTER ELLIOT TREPHINING OPERATION (MODIFIED FROM AEROLA[2])

| Author | Year | Number of Elliot Operations | No. Infections | Percent |
|---|---|---|---|---|
| Meller, J. | 1914 | 178 | 3 | 1.7 |
| Knapp, A. | 1914 | 20 | 2 | 10.0 |
| Steinert | 1912–1920 | 179 | 12 | 6.7 |
| Lieberman, L. v. | 1920 | 200 | 0 | 0 |
| Asmus, E. | 1920 | 40 | 1 | 2.5 |
| Grög | 1920 | 22 | 3 | 13.6 |
| Grósz, E. v. | 1920 | 100 | 4 | 0.5 |
| Kümmel | 1920 | 100 | 4 | 4.0 |
| Goldschmidt | 1920 | 179 | 7 | 3.9 |
| Butler, T. H. | 1921 | 160 | 5 | 3.1 |
| Pillat | 1921 | 55 | 4 | 9.0 |
| Helpburn | 1921 | 125 | 1 | 0.8 |
| Late, D. | 1921 | 150 | 1 | 0.7 |
| Spital, G. | 1921 | 500 | 9 | 1.8 |
| Grunert | 1922 | 276 | 7 | 2.5 |
| Wessely, K. | 1922 | 116 | 1 | 0.9 |
| Birch-Hirschfeld | 1922 | 60 | 0 | 0 |
| Ticko | 1922 | 165 | 0 | 0 |
| Mursin | 1922 | 86 | 0 | 0 |
| Manolescu | 1922 | 99 | 1 | 1.0 |
| Bentzen | 1923 | 166 | 4 | 2.4 |
| Ohm, J. | 1924 | 53 | 1 | 1.9 |
| Schultz | 1925 | 197 | 3 | 1.5 |
| Davenport, R. C. | 1926 | 536 | 14 | 2.6 |
| Schieck | 1926 | 197 | 3 | 1.5 |
| Polev | 1927 | 200 | 2 | 1.0 |
| Judin, K. | 1928 | 309 | 4 | 1.3 |
| Scheerer | 1928 | 240 | 1 | 0.4 |
| Hildesheimer | 1928 | 20 | 0 | 0 |
| Straeten | 1930 | 40 | 1 | 2.5 |
| Onfray | 1930 | 50 | 2 | 4.0 |
| Kurz, J. | 1930 | 96 | 2 | 2.1 |
| Ploman & Granstrom | 1932 | 151 | 3 | 2.0 |
| Galetski-Olin[3] Löfgren Aerola | 1907–1932 | 305 | 1 | 0.3 |
| Thomsen[5] | 1939 | 244 | 2 | 0.8 |
| Brausewetter[6] | 1942 | 75 | 3 | 4.0 |
| | | Total 6,051 | Total 109 | Average 1.7 |

extractions. Consideration of these cases led to the conclusion that the filtering scars occurred at the margins of the cataract incision or between the sutures in each case, in spite of three corneoscleral sutures. As a result of this experience one of us (H. S. S.) is using five corneoscleral sutures in all cataract operations as a means of decreasing the incidence of this complication.

In the event that such a filtering scar forms, an attempt should be made to eradicate it. The following three cases indicate the means used for this purpose. Thermocautery is the simplest means and, failing this, one should resort to direct suture.

## CASE HISTORIES

### CASE A

K. L., a 64-year-old woman, had an uneventful intracapsular cataract extraction on November 2, 1955, resulting in normal visual acuity with a correction of +11.25D. sph. ⊃ +2.25D. cyl. ax. 10°. In February, 1956, it was noted that a large filtering bleb was present which persisted. On August 30 and again on September 20, 1956, direct thermocautery to the bleb was done. The bleb disappeared (figs. 15 and 16).

### CASE B

R. O., a 21-year-old diabetic, had an uncomplicated intracapsular cataract extraction on September 13, 1956. During the postoperative period an incarceration of iris under the flap was noted at the nasal end of the incision. The corrected visual acuity was 20/20 but the filtering scar was

Fig. 15 (Sugar and Zekman). *Case A.* Appearance of filtering bleb following uneventful cataract extraction.

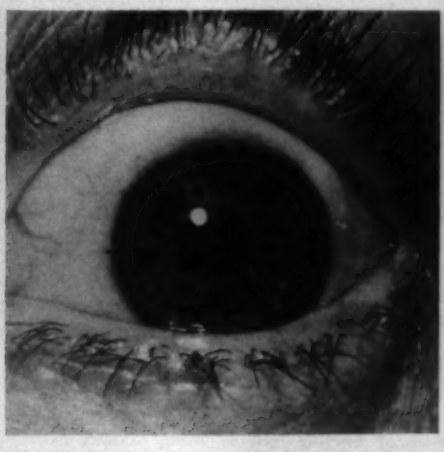

Fig. 16 (Sugar and Zekman). *Case A.* Appearance of bleb one month after thermocautery of bleb.

noticed by the patient. On February 12, 1957, this was cauterized. Two days later the chamber suddenly collapsed. The patient was hospitalized immediately and the prolapse excised and the scleral edges closed with a corneal needle. Upon healing the filtering scar no longer was present (figs. 17 and 18).

CASE C

G. B., a 43-year-old woman, had an uneventful left intracapsular round-pupil cataract extraction on April 17, 1956. Her corrected vision was 20/20 but she complained of tearing associated with a filtering scar at the nasal end of the incision area which she felt against her lid. Direct mild thermocautery was applied superficially to this scar on November 9, 1957. By November 27th, the tearing had disappeared. The scar flattened out well.

TABLE 2

INCIDENCE OF LATE INFECTION AFTER IRIDENCLEISIS (MODIFIED FROM DELLAPORTA[3])

| Author | Year | No. of Operations | No. Infections | Percent |
|---|---|---|---|---|
| Vasek | 1924 | 19 | 0 | 0 |
| Ikonomopoulos | 1926 | 31 | 0 | 0 |
| Butler | 1926 | 15 | 0 | 0 |
| Pillat | 1928 | 97 | 0 | 0 |
| Gifford, H. | 1929 | 125 | 0 | 0 |
| Gifford, S. R. | 1929 | 29 | 0 | 0 |
| Holth | 1929 | 233 | 2 | 0.9 |
| Blaickner | 1930 | 42 | 0 | 0 |
| Gjessing | 1930 | 122 | 0 | 0 |
| Holst | 1931 | 81 | 0 (1?) | 0 (1.2?) |
| Ladekarl | 1932 | 23 | 0 | 0 |
| Galetski-Olin, Löfgren, Aerola | 1907–1932 | 137 | 1 | 0.7 |
| Hagen | 1932 | 81 | 0 | 0 |
| Holst | 1932 | 281 | 2 | 0.6 |
| Goar & Schultz | 1935 | 72 | 0 | 0 |
| Diaz-Dominguez | 1935 | 14 | 0 | 0 |
| Butler | 1936 | 74 | 0 | 0 |
| Constantine | 1937 | 107 | 0 | 0 |
| Weekers & Fanchamps | 1937 | 49 | 0 | 0 |
| Gjessing | 1939 | 76 addit. | 0 | 0 |
| Weekers & Bonhomme | 1941 | 9 | 0 | 0 |
| Brauswetter | 1942 | 75 | 0 | 0 |
| Tatar | 1943 | 32 | 0 | 0 |
| Dellaporta[3] | 1947 | 224 | 0 | 0 |
| | | Total 2,048 | Total 5 | Average 0.3 |

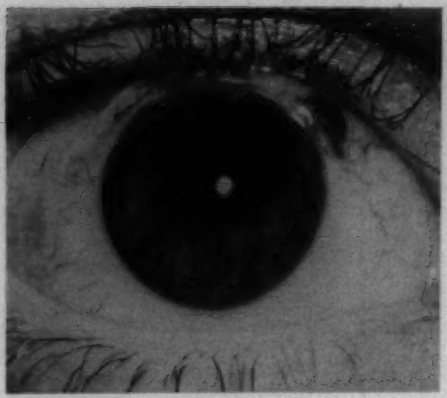

Fig. 17 (Sugar and Zekman). *Case B.* Appearance of filtering bleb following cataract extraction.

It is obvious that the incidence of late infection is highest with the trephining operation and lowest with iridencleisis. Let us consider the possible reasons for this. Elliot[1] himself contended that late infection resulted from failure to use thick flaps and suggested that the persistence of a leak along the line of the original conjunctival incision or the formation of a very thin flap help toward its occurrence. The persistence of a leak along the line of the original conjunctival incision may be the cause for continued delay in reformation of the anterior chamber postoperatively but has not appeared to be a cause for late infection. The existence of a thin bleb is unquestionably related to the incidence of infection.

Of the two factors necessary for the occurrence of late infection, namely, (1) a conjunctivitis produced by an organism capable of overcoming any tissue resistance, and (2) a suitable pathway for entrance of the organism into the interior of the eye, the second factor is the only one which varies with the antiglaucoma operations. The more thin-walled the bleb and the more patent the filtering channel, the more likely is infection to enter. Trephination has obviously the most patent channel of the antiglaucoma operations, as is shown by the greater frequency of hypotony in this operation than with iridencleisis.

Failure to obtain thick conjunctival flaps with the Elliot operation, notwithstanding Elliot's contention, is not dependent as much on the surgeon as on the very nature of the operative procedure. With the trephining operation, the flap is dissected up to and into the cornea. Even with the usual precautions to include Tenon's capsule with the flap, it is usually thin at the limbus. Tenon's capsule joins the subconjunctival connective tissue here. It becomes even thinner with advancing age. With the iridencleisis operations, dissection is usually not made beyond one to two mm. from the limbus, depending on the type of operation. Thus the nature of the Elliot trephining operation itself explains the main cause for the vulnerability of the affected tissues to late infection.

## Prognosis and Treatment

The typical clinical picture of late infection after trephination may be described as follows:

A purulent conjunctivitis with injection of the conjunctiva is followed by blurring of vision and pain in the eye. The trephina-

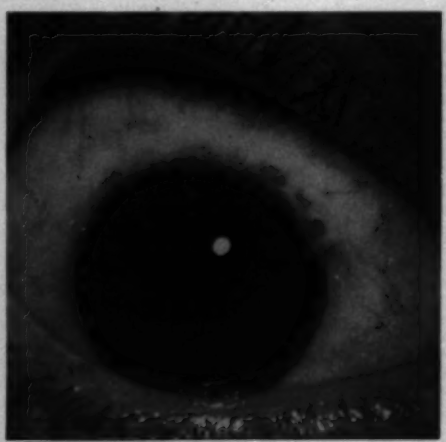

Fig. 18 (Sugar and Zekman). *Case B.* Appearance after excision of prolapse and closure of scleral wound.

tion bleb becomes yellow and opaque, with fibrin usually extending into the anterior chamber. A one to two-mm. hypopyon is usually present. Aqueous flare is present and posterior synechias tend to form quickly. In some instances the anterior chamber decreases in depth, due to leakage through the necrotic conjunctiva.

In the pre-antibiotic days (table 3) the patient was treated with atropine or homatropine and Neosynephrine to dilate the pupil, mercury oxycyanide and aqueous mercurochrome drops, local heat, typhoid vaccine intravenously in increasing doses every other day, or, if the patient was elderly, 10 ml. of boiled milk intramuscularly and, in many cases, X-ray therapy to the bleb in amounts varying up to 525 roentgens.

In our cases the healing process required

TABLE 3

SUMMARY OF LATE INFECTIONS DURING PRE-ANTIBIOTIC PERIOD 1935–1941 (INCLUDING TWO TREATED WITH ADDITION OF SULFANILAMIDE)

| Case No. | Eye | Infection No. | Year | Change in Visual Acuity | Tension after Infection | Operation | Treatment | End Result | Time in Hospital |
|---|---|---|---|---|---|---|---|---|---|
| 1 | R | 1 | 1935 | 20/40→20/40 | N | Trephination | Oxycyanide of mercury, mercurochrome, heat, typhoid v. 3 injections, sod. salicylate, 213 r X rays | Healed | 2 wk. approx. |
| 2 | R | 1 | 1937 | 20/50→20/50 | N | Trephination | 300 r X rays, typhoid 5 inj., oxycyanide, mercurochrome, atropine, calcium gluconate 1 time daily | Healed | 6 da. hospital |
| 2 | R | 2 | 1939 | 20/50→20/50 | N | Trephination | Cleared without intraocular involvement | Healed | 2 da. |
| 3 | L | 1 | 1937 | 10/200 to HM | N | Trephination | Atropine, neosynephrine, mercurochrome, mercury of oxycyanide, heat, calcium gluconate 60 g. orally, 10 cc. boiled milk and later typhoid 7 injections | Healed | 25 da. |
| 4 | L | 1 | 1939 | | | Trephination | Typhoid 5 inj., heat, anterior chamber never formed in spite of cyclodialysis and lens extraction | Enucleated | |
| 5 | R | 1 | 1939 | | | Trephination | Typhoid, heat, atropine and antiseptics | Eviscerated | |
| 6 | R | 1 | 1939 | 20/20→20/30 | N | Trephination | Typhoid 3 injections, homatropine | Healed | Well 1 wk. |
| 7 | L | 1 | 1939 | 20/20→HM | remained elevated | Trephination | Typhoid 3 injections, 5 injections milk, X-ray total 320 r | Healed | 3 wk. |
| 8 | L | 1 | 1936 | 20/200 | remained elevated | Trephination | Homatropine, oxycyanide, mercurochrome, heat, typhoid 5 injections | Healed | 3 wk. |
| 8 | R | 1 | 1936 | 20/70→20/70 | N | Trephination | Typhoid 3 injections atropine, antiseptics | Healed | 2 wk. |
| 9 | R | 1 | 1937 | 20/40→20/100 | N | Trephination | Atropine, oxycyanide, heat, typhoid one inj. | Flap drawn down, healed | 1 wk. |
| 9 | R | 2 | 1937 | 20/100 poor because of lens changes | N | Trephination | Typhoid 2 injections, 525 r X rays | Healed | 8 da. |
| 9 | L | 1 | 1937 | Poor because of lens changes after infection | N | Trephination | Atropine, antiseptics, X rays 465 r, 4 typhoid injections | Healed | 11 da. |
| 10 | L | 1 | 1941 | CF | N | Trephination | Atropine, antiseptics, typhoid, X rays 100 r | New flap drawn down | 2½ wk. |
| 11 | R | 1 | 1940 | No LP | N | Trephination | Sulfanilamide, atropine, typhoid | Eviscerated | |
| 12 | R | 1 | 1940 | 20/70→20/100 | remained elevated | Trephination | Atropine, sulfanilamide 15 gr. q.i.d. | Healed | Hospital at least 1 wk. |
| 13 | L | 1 | 1940 | 20/200→20/70 | N | Trephination | Typhoid, antiseptics, atropine, ½ erythema, dose X rays | Healed | Hospital 1 wk. |

SUMMARY: 17 infections, 15 eyes, 13 patients, hospital average of at least 12 days, not counting 2 eviscerations, 1 enucleation.

TABLE 4

SUMMARY OF LATE INFECTIONS DURING ANTIBIOTIC PERIOD 1947–1956

| Case No. | Eye | Infection No. | Year | Change Visual Acuity | Tension after Infection | Operation | Treatment | End Result | Time |
|---|---|---|---|---|---|---|---|---|---|
| 14 | L | 1 | 1954 | 20/100→20/100 | N | Trephination | Aureomycin, scopolamine, cortisone locally; penicillin IM | | 2 da. (no hosp.) |
| 15 | R | 1 | 1953 | 20/80→20/80 | N | Trephination | Terramycin locally; penicillin injection | | 1 wk. (no hosp.) |
| 16 | L | 1 | 1953 | resulted in LP (cataract) | N | Trephination | Penicillin, streptomycin injections; aureomycin, atropine, sulfacetamide locally | | Hospital 4 da. |
| 17 | L | 1 | 1954 | 20/20→20/25 | N | Trephination | Neomycin, cortisone locally; Achromycin, penicillin injections | | 12 da. (no hosp.) |
| 17 | R | 1 | 1955 | 20/20→20/20 | N | Trephination | Neomycin, cortisone locally; penicillin injections | | 7 da. (no hosp.) |
| 18 | R | 1 | 1956 | | — | Trephination | Penicillin injections; atropine, penicillin subconj. | | Evisceration |
| 19 | L | 1 | 1956 | HM | N | Trephination | Chloromycetin, Neosporin, Gantrisin locally | | Markedly improved 1 wk., well 6 wk. (no hosp.) |
| 20 | L | 1 | 1947 | | N | Iridencleisis | Penicillin injections; local penicillin | | Hospital phthisis |
| 21 | L | 1 | 1955 | 20/25→20/25 | N | Cataract | Neomycin, Polymyxin B, scopolamine locally; Mysteclin orally | | 11 da. (no hosp.) |
| 22 | R | 1 | 1956 | 20/30→20/30 | N | Cataract | Penicillin IM; cortisone Polysporin locally | | 1 wk. (no hosp.) |
| 23 | L | 1 | 1957 | 20/20−4 20/25+3 | N | Iridencleisis | Hydrocortisone, Chloromycetin locally | | Cleared in 2 da. (no hosp.) |

SUMMARY: 11 infections, 11 eyes in 10 patients. Only 3 hospitalized—1 evisceration, 1 phthisis.

an average of 12 days of hospitalization in those who got well, and lasted three weeks or more in some cases. Additional time elapsed before the eye became entirely clear. The visual acuity was reduced in half the cases. The tension was not controlled in three cases after the infection cleared. In severe cases, with purulent endophthalmitis, with exudate visible behind the lens, the end-result was usually evisceration or enucleation.

The picture of late infection during the antibiotic period (table 4) brightened considerably in that the usual case cleared quickly, usually without hospitalization, in an average of seven days and usually with complete return of visual acuity and bleb function. In our series, all patients who got well had normal tension afterward. In the severe cases, with exudate in the vitreous at the time when first seen, the prognosis was and is still bad. The treatment during the antibiotic period has been the use of penicillin and other drugs, such as the tetracyclines, Chloromycetin, or streptomycin by intramuscular injection daily, local antibiotics such as aureomycin, neomycin, Neosporin, Chloromycetin, and the sulfonamides, and cortisone drugs locally and atropine or scopolamine to dilate the pupil.

Of the pre-antibiotic group seen between 1935 and 1941, including two cases which had sulfanilamide injections in addition to the usual therapy, there were 17 infections in 15 eyes in 13 patients, two patients having had two late infections at different times in the same eye. In the group treated with antibiotics between 1947 and 1956 there were 11 infections in 11 eyes of 10 patients (including two following cataract extraction). There were three eyes enucleated, eviscerated, or phthisical in the first group, two in the second. However, the latter is not to be taken as indicating the comparative results. All of the lost eyes had severe infections and were treated after severe intraocular exudation had taken its toll. The visual results and rapidity of recovery in the remaining majority of cases indicate a remarkable difference in favor of the antibiotic-treated eyes. The prognosis, therefore, must be considered as much improved today. A late infection, when seen early, should present no very serious problem in therapy.

What significance does the greater incidence of late infection after trephination have in regard to the choice of antiglaucoma surgery and how does the better prognosis of the infection today help? In order to answer these questions we must compare the results of trephination and iridencleisis from the viewpoint of their tension-lowering effect and then weigh in the balance the advantages against the disadvantages.

In our own experience, the chance of normalizing tension after trephination is somewhat greater than after iridencleisis. In the series of 48 trephinations and 29 iridencleises done in private practice by one of us (H. S. S.) between the years 1951 and 1956 the following results were obtained: five iridencleises needed subsequent trephinations and three trephinations needed other surgery for control of tension. Thus, 17 percent of iridencleises failed as compared to six percent of trephinations insofar as tension control alone was concerned.

It is thus apparent that the advantage of greater tension-lowering with trephination is offset by the greater incidence of infection. Late infection, though less serious today, is still of considerable importance. On the other hand, the technical aspects of iridencleisis are simple. Iridencleisis tends to be preferred by the ophthalmologist who operates infrequently. The choice of operation, thus, becomes a personal matter with each surgeon. Perhaps the age of the patient should be an important factor in the choice. Iridencleisis certainly should be preferable in the age group under 65 years.

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# PECULIAR TYPE OF CORNEAL ULCER*

## Associated with Candida mycoderma


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### Introduction

Until recently, infection of the cornea by molds and fungi has been observed but rarely in cold and temperate climates and then mostly as a consequence of trauma in persons living in agricultural areas. However, the literature of the last few years reports an increasing number of cases of suspected or proved keratomycosis, due either to superficial invaders or to micro-organisms capable of systemic dissemination, the initial ocular lesion then being the site from which the disease spreads along the lymphatic channels or by way of the blood stream.

In addition to this exogenous, primary type of infection, cases of metastatic involvement of the ocular structures from distant foci are seen; in these the cornea may be affected, though its infection is secondary to that of the uvea and is usually of lesser import.

Besides the truly pathogenetic fungi, which possess a well-established virulence, others, classically considered to be potential pathogens, mere saprophytes, or even only secondary contaminants, have occasionally been held responsible for the occurrence of corneal disease. We are here concerned mainly with this latter group of agents and with those of the former which produce a strictly localized damage to the outer membranes.

Of the 55 different types of fungi isolated from the conjunctival sac of normal and variously diseased eyes by A. Fazakas[8-12] and S. Fazakas,[13,14] many have been shown conclusively to be the cause of some form of keratitis.

During the last five years, a special type of corneal ulceration with a definite clinical course has made its appearance in the central, temperate part of Argentina (fig. 1). The etiology of the condition is still debatable, in spite of the fact, to be shown presently, that the possibility of its being mycotic has received strong support from available evidence. Several reasons, however, have induced us to report our findings without further delay. The constancy of both the disease signs and symptoms and of its clinical course, its peculiar unresponsiveness to all kinds of antibiotic and chemotherapic drugs, its frequency, which is rising at such an

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Fig. 1 (Urrets-Zavalía, Remonda, and Ramacciotti). Geographic distribution of the 36 reported cases of suspected keratomycosis.

alarming rate that this has now become one of the commonest corneal lesions (fig. 2), and finally its diffusion over an increasingly large area, all seem to warrant a presentation even at this early stage.

## Incidence

Up to the time of writing, 36 cases have been observed in persons whose ages ranged from four to 58 years. As a rule, the development of the malady was preceded by a superficial injury, such as the penetration and removal of a corneal foreign body. In a few instances, it also appeared as a postoperative complication (pterygium excision, two cases; muscle surgery, one case; trephination for juvenile glaucoma, one case) or as complication of previous disease (corneal herpes, one case; absolute glaucoma, one case; paralytic lagophthalmos, with diminished lacrimal secretion, one case); while in some cases, no clear history of former damage to the ocular structures could be obtained. In 18 of the 36 cases, the patients had already been treated elsewhere with miscellaneous eyedrops and ointments, among which those containing antibiotics and/or cortisone were the most common. In only one case was the lesion bilateral.

## Clinical features

The condition usually starts with considerable pain, photophobia, blepharospasm, and lacrimation, the importance of which varies greatly with the severity of the corneal involvement. Marked conjunctival injection is a constant finding and there may be some swelling of the lids.

The corneal lesion appears as a well-delineated, irregularly round ulcer, which is invariably confined to the outermost layers of the stroma or even to Bowman's membrane and has a grayish-white, dry surface, resembling a solidified, splashed drop of wax. A most important sign in differentiating the lesion from other types of corneal ulceration lies in the fact that all attempts at staining the break in the continuity of the epithelium with water-soluble vital dyes (such as sodium

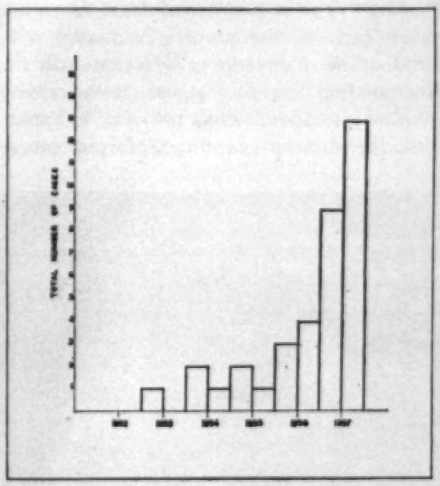

Fig. 2 (Urrets-Zavalía, Remonda, and Ramacciotti). Chronologic distribution of the 36 cases of corneal ulceration in semestral groups.

fluorescein or methylene blue) are ineffectual as if the tension upon the surface of the aqueous vehicle were as high as that of mercury when spilled on a glass panel (figs. 3 and 4). The ulceration may remain limited to a very small area, some one to two mm. in diameter, or—especially if untreated—extend over a large part of the cornea. Never has it been seen to invade the deeper layers of the substantia propria or to be accompanied by hypopyon, an abnormal aqueous flare, keratic precipitates, or other signs of iridociliary reaction; yet, a certain degree of diffuse corneal edema frequently exists, as well as some folds of Descemet's membrane. Vascularization has always been conspicuously absent, except in one case.

The floor of the lesion is covered with a thin membrane which, though intimately adherent to the underlying tissue, may be removed in the initial stages with the aid of a sharp corneal knife or sclerotome. Later, this membrane can no longer be dissected away, unless a true keratectomy is performed and some of the superficial corneal lamellae are removed. In either case, a marked improvement sets in and complete healing occurs in a matter of days. When not taken care of, the process is usually self-limiting in that soon progression into the surrounding cornea ceases; however, no tendency to spontaneous recovery is apparent, the disease adopting a torpid course which may drag over a period of months.

Finally, the pain and the perikeratic injection begin to subside, while the epithelium, which up to that moment had been unable to spread over the lesion, covers it up in one week or two; the gray membrane is thus buried under a regular surface and shows clear signs of fragmentation (fig. 5). This commences peripherally, giving the membrane a ragged contour, and extends slowly toward the center of the lesion while the detached shreds, which lie under the epithelium like the membrane itself, are gradually resorbed, the situation being as if suddenly the causative agent lost all virulence and the membrane behaved as an inert foreign body.

Vision may be seriously handicapped during the whole process if the lesion happens to occupy the axial part of the cornea. As the latter clears up, however, it may return to normal or slightly subnormal levels.

All kinds of antibiotic and chemotherapic drugs have been used and proved of absolutely no avail. Penicillin, streptomycin, aureomycin, oxytetracycline, tetracycline, erythromycin, and chloramphenicol, either systemically or topically, as well as topical polymyxin and neomycin, have been unable to modify in any way the course of the disease. Sulfadiazine, sulfamerazine, sulfamezathine, and sulfapyridin were also useless.

Of the many substances showing an inhibitory effect upon the growth of fungi which

Figs. 3 and 4 (Urrets-Zavalia, Remonda, and Ramacciotti). Grayish corneal ulcer with clear-cut margins and finely granulated, dry surface; marked perikeratic injection. Instillation of one-percent methylene blue did not stain the lesion.

Fig. 5 (Urrets-Zavalia, Remonda, and Ramacciotti). Ulcer healed, gray, subepithelial membrane with jagged edges in process of fragmentation and resorption.

have been isolated in recent years (Leopold[21]), only nystatin has been employed, both orally (in daily doses of 1,500,000 units) and in ointment form; unfortunately, it has displayed little or no activity. The oral administration of large doses of a saturated solution of potassium iodide has been likewise entirely unsuccessful. The prescribing of argyrol drops and of a cortisone ointment never produced any noticeable improvement. In some patients, a five-percent aqueous solution of sodium propionate, as advocated by Theodore,[39] was applied every two or three hours for several days without any apparent change. Fever therapy was equally ineffective.

On the other hand, scrapings of the ulcer with a fine curette or cataract knife seemed to be highly beneficial, especially when followed by local applications of trichloracetic acid or of a three-percent alcoholic iodine solution and when performed at short intervals (every three or four days). The course of the disease is thus markedly shortened but otherwise remains essentially unchanged in that it goes through the same phases of epithelization and membrane resorption as outlined. The usefulness of tincture of iodine appears to depend on its general antiseptic and caustic properties and not on a specific effect. The possibility that repeated applications of this agent may lead to permanent opacification of the cornea need not be feared for no such event occurred in the whole series of patients.

Only rarely does the gravity of the clinical picture seem to require a lamellar corneal transplant. In one case, this procedure was done with excellent results.

As can be gathered from the foregoing, the final prognosis is good. If the condition is promptly recognized and adequate treatment is instituted, complete recovery may be expected in almost all cases. Nevertheless, its protracted course, often attended by excruciating pain which may necessitate the frequent instillation of tetracaine hydrochloride drops and even the use of strong analgesics, as well as its incapacitating nature, make the disease a redoubtable one.

The diagnosis should be easy if one bears in mind the features of the corneal lesion and above all the fact that currently used aniline dyes will not stain its surface.

### Mycologic studies

In 25 out of the 36 recorded cases mycologic laboratory studies have been carried out. In all of these, smears were made for direct microscopic examination of the material obtained by scraping, with the result that no fungi but only the bacteria normally found in the conjunctival sac could be demonstrated. The specimens were examined both unstained and colored by the Gram, May-Grünwald, and Ziehl-Neelsen methods.

In 14 cases, cultures were made in Sabouraud's dextrose-agar and grown at room temperature. The results were negative in six, five of which had already received some local treatment. In one case, a penicillium mold of an undetermined species developed in a series of dextrose-agar slants. In this case, cutaneous tests were performed which showed a marked hypersensitivity to penicillium, aspergillus, and Candida albicans.

In the remaining seven cases, all still untreated, there was growth of a fungus belonging to the genus Candida, later classified as

C. mycoderma (Ress) by Prof. P. Negroni. Isolated, convex, creamy-white colonies appeared in eight or nine days in the semisolid medium; they were seen to coalesce rapidly into a furrowed, cerebriform shiny mass (fig. 6) which had a superficial resemblance to the cultures of some species of Nocardia (Moss and McQuown,[27] fig. 18B). Microscopically, there were yeastlike, round and oval, budding, thin-walled cells measuring 4.0 to 6.0 μ in diameter, as well as a few short hyphal fragments, but no ascospores (fig. 7). Cultures made subsequently in a diversity of media (Prof. Dr. P. Negroni) confirmed the diagnosis.

In five cases, inoculations in the cornea of adult rabbits were made by scarification and instillation into the conjunctival sac of two or three drops of a suspension of Candida mycoderma; this was prepared in accordance with Ley's[22] directions, by emulsifying the surface of a culture in Sabouraud's medium in physiologic saline. The results were uniformly negative.

All other laboratory tests were noncontributory: the blood and urine were normal and the serologic reactions negative. The results of the Mantoux tuberculin reaction did not differ significantly from those corresponding to the general population.

Fig. 6 (Urrets-Zavalía, Remonda, and Ramacciotti). Candida mycoderma. Giant colony, 14 days, Sabouraud glucose-agar, room temperature.

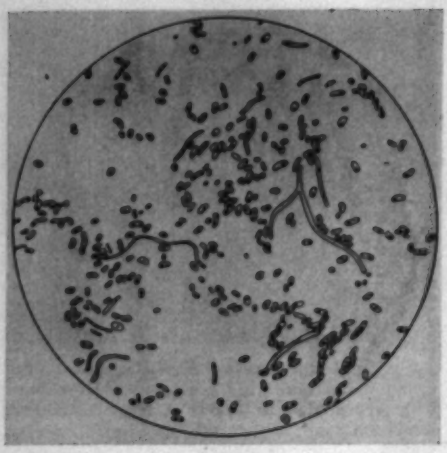

Fig. 7 (Urrets-Zavalía, Remonda, and Ramacciotti). Drawing of wet preparation from culture. Note small, thin-walled, spheric and oval elements, and short hyphal fragments. (×440.)

## Discussion*

Primary infiltrative and ulcerative corneal lesions have been ascribed to superficial invasion by a wide variety of molds.

Well-authenticated cases of moniliasis have been reported by Romano Yalour and coworkers,[23] Sykes,[35] and Mendelblatt,[25] who demonstrated the presence of Candida albicans in the scrapings obtained from large corneal ulcers; these may be associated with some degree of hypopyon and progress occasionally to perforation and loss of the eye.

Some such cases have been described under the name of blastomycosis, but since Blastomyces is a genus comprising several pathogenic yeasts, it would be better to resort to that expression only in connection with in-

* A thorough discussion on the classification of the mycotic processes which have been recognized in human pathology, with special reference to their ophthalmologic aspects, may be found in Blanco and Ré's[2] important monograph on the subject.

fections caused by B. dermatitidis (Gilchrist's disease) or by South American Blastomyces (blastomycosis brasiliensis) (Birge,[4] Rocha,[32] Sales[36]).

One case of Cephalosporium keratitis with hypopyon, proven by culture, has been reported by Bedell.[2] In this instance, as in that just mentioned of a corneal ulcer due to C. albicans observed by Sykes, potassium iodide given internally produced rapid improvement, until complete healing was achieved by the end of two weeks.

Hypopyon ulcers may also be caused by Aspergillus fumigatus (Stern and Kulvin,[37] Theodore,[40] Hervouet and Lenoir[18]), a mold which also shows a poor response to antibiotics but reacts favorably to local and general iodine therapy.

Monosporium keratitis has also been found in association with an intractable corneal ulcer (Pautler et al.[29]). Streptotrichosis is a far from common causative agent in exogenous ulcerative keratitis (Amías,[1] Niño,[28] Gordon[16]). According to Birge,[4] the cornea may be invaded directly from the lids when the latter show lesions due to Blastomyces dermatitidis.

Less severe corneal lesions in the form of a nodular or superficial punctate infiltration have occasionally been ascribed to infection by Acrostalagmus cinnabarinus Corda (Fazakas[8]) and by Actinomyces bovis (Streptothrix actinomyces) (Birge[4]). A finely granular infiltration may also be produced by Nocardia, a saprophyte of the soil belonging to the genus Actinomyces (Benedict and Iverson[3]). A case of primitive conjunctivitis without corneal involvement was found by Ré and Blanco[31] to be due to a yeastlike mold of the Candida genus which, on direct examination, showed a certain resemblance to that isolated from our patients; it must be mentioned that while in this case the oral administration of potassium iodide proved fruitless, a short course of sulfanilamide resulted in complete cure.

Although instances of invasion of the cornea in cases of systemic fungus disease are by no means exceptional, they will not be discussed here as they fall beyond the scope of this paper.

Parenthetically, it may be remarked that the mycotic origin of any given external condition of the eye or its adnexa may be very difficult to establish with absolute certainty. As pointed out by Thomas,[41] the finding of fungi in the ocular secretions is not sufficient basis for such a diagnosis, as the lacrimal apparatus, the lids, and the conjunctiva often yield a fungus growth when properly investigated (Birge[4]). The presence of a large number of different pathogenic and saprophytic organisms on the lid borders and the fornices of normal persons has repeatedly been shown by Fazakas.[10-11]

Due to their ubiquity and to the fact that some are merely common contaminants, fungi of many species can be found on culture. They either (1) do not play any active role in the production of the condition being investigated, (2) act only as secondary invaders, or (3) were not even present in the affected tissues but appeared as a result of airborne pollution. Accordingly, it is only with extreme caution that any definite significance can be attached to the demonstration of a particular type of mold in a given clinical case.

On the other hand, it must be remembered that whereas some fungi thrive easily on culture, some may develop slowly and with extreme difficulty, or require the use of special media; therefore, a negative result does not necessarily mean that a diagnosis of mycotic infection should be ruled out.

It may be concluded, however, from a review of recent literature that all, or almost all, corneal ulcers of mycotic origin have a certain number of features in common which serve to distinguish them from other conditions. Among such features are the granular appearance of the erosion, which seems to be covered by an opaque membrane or has a dirty gray base that becomes smooth and less dull after scraping; its clear-cut limits where a thin gutter may exist; the

stubborn course; unresponsiveness to almost all forms of treatment; and the fact that frequently the disease appears as the direct result of an injury.

In the cases under consideration, the corneal lesion exhibited a remarkably constant picture, characterized by all the traits just listed and by a complete lack of uveal reaction. Consequently, from a purely clinical standpoint, a tentative diagnosis of keratomycosis seemed to be justified, in that the prevailing lesions showed a close similarity to those in which a fungus etiology could be proved beyond doubt, while differing considerably from all other known types of corneal disease. That the common bacterial invaders should not be incriminated is suggested by the futility of the administration of many antibiotic and chemotherapic agents. Also from a clinical point of view, there appear to be reasons favoring the idea that a special type of organism must have come into play: the fact that amongst the 36 observed cases not one single instance of perforation was recorded, the absence of hypopyon, the fact that the ulcer did not stain with fluorescein or methylene blue, and above all the inefficacy of iodide medication. In addition, fungi which have been held responsible for the occurrence of corneal lesions are, as a rule, easily demonstrated.

The circumstance that in no case could a fungus be found by microscopic examination of the smears obtained directly from scrapings would be difficult to reconcile with the presence of a mycotic process were it not for the fact, mentioned by Gordon[16] and underscored by Birge,[4] that negative results are not infrequent in fungus disease.

Inoculations on the rabbit corneal surface were consistently negative, a fact which has been regarded by Blanco and Ré[5] as of common occurrence and which is to be attributed to the great resistance normally offered by the cornea to fungus infection.

As pointed out by Ley,[22] the average incidence of fungus keratitis on inoculation varies considerably with different types of molds. Aspergillus fumigatus, Candida albicans, and Allescheria boydii often produce corneal ulcers of diverse severity when applied to the traumatized rabbit cornea, whereas Aspergillus terreus, Cephalosporium, and Geotrichum fail to have any such effect. The incidence also varies with the age of the animals, for more virulent organisms are required to produce corneal lesions in mature rabbits than in younger ones. Hervouet and Lenior[18] succeeded in transmitting Aspergillus fumigatus infection to the rabbit eye only when the animals were in a poor general condition resulting from malnutrition. Benedict and Iverson[3] also were unable to produce a disease process in the rabbit, the guinea pig, and the mouse by inoculation of Nocardia. As Candida albicans is the only member of that genus which behaves as a pathogen for laboratory animals (Conant et al.[6]), it is, therefore, no wonder that the attempts at inoculation with C. mycoderma were unsuccessful.

As mentioned previously, a penicillium was found in one instance where cutaneous tests showed a marked sensitivity to this and to other fungi; the import of such a fact is still uncertain.

Candida mycoderma (Ress) is considered by most authors to be just a potential pathogen, devoid of great medical importance. So far, it seems that only a few strains of that member of the Candida genus, which is closely related to C. krusei and almost identical with C. vanlaeriana, have been isolated and properly classified. One was found in England, in the polluted waters from a dairy; five strains of human origin were isolated in Dutch hospitals from sputum, pharyngeal secretions and an abdominal infiltration (Lodder and Kreger-Van Rij[24]). As yet, no instances of ocular disease due to this mold are on record.

Being fully aware of the limited value that may be assigned to the finding of a fungus of such a dubious pathogenic quality, we are reluctant to attribute any definite significance to the fact that that mold was isolated from

our cases. Nevertheless, the following points must be emphasized:

First, it is only very rarely that C. mycoderma is encountered in laboratories where cultures are made under proper precautions. Further, it must be noted that only colonies of the organism grew, both in the initial cultures and several transplants, to the exclusion of all other types of yeasts or bacteria.

The exact source of infection in the patients presented remains undetermined; however, since a large number of them lived in rural areas and were engaged in farming activities or in the buying and selling of grains, it may be assumed in this case, as in that of other mycotic diseases (Pautler et al.[29]), that the responsible organism is widely disseminated.

The question now rises as to how an ordinarily nonvirulent mold, such as C. mycoderma, started causing such a severe corneal disorder and with such frequency. Two important facts have to be stressed: In the first place, one has to bear in mind that treatment with cortisone and antibiotics of diseases of the anterior segment of the eye may increase the susceptibility of the tissues to some micro-organisms. The potential hazards of that medication in facilitating fungus keratitis have recently been strongly emphasized by Ley and Sanders.[23] Thygeson and co-workers[42] and Mitsui and Hanabusa[26] have reported cases of fungus infection of the cornea after the topical administration of cortisone, while Ley[22] has shown experimentally that cortisone applied to the traumatized cornea in the presence of pathogenic fungi results in a high incidence of infection, and that the use of broad-spectrum antibiotics can increase in some cases the susceptibility of that membrane to Monilia.

As pointed out by Ley, it is quite possible that normally saprophytic or symbiotic fungi may become potential pathogens by alteration in host resistance by corticosteroid therapy. By disrupting the delicate balance which normally exists between the various components of the flora of the conjunctival cavity, the local application of antibiotics may have a similar effect.

Of course, this process is in no way limited to the eye. There are frequent reports of intestinal moniliasis after administration of antibiotics. An increasing number of cases are seen in which cutaneous, buccal, vaginal, and respiratory fungus infections are the outcome of that therapy (Ronchese and Kern,[34] Tomaszewski,[43] Pundel and Ost,[30] de Graciansky and Delaporte[17]). So , it is not without reason that Jausion and Hervé[20] have maintained recently that mycoses are the maladies of the future.

Cases of keratomycosis as a complication following the local application of antibiotic drops and ointments could, to be sure, be explained in that way. Since, however, the condition frequently appears primarily, that is, before the patient has been submitted to any form of treatment, one must resort to another interpretation.

The emergence of new, more aggressive strains of bacteria (Staphylococcus aureus, Streptococcus pyogenes, and Mycobacterium tuberculosis) is a well-known fact to which a great deal of attention is now being paid. These strains, which are usually antibiotic-resistant, may eventually become so different from the original ones as to produce superinfection on inoculation (Howe,[19] Finland,[15] Dowling et al.[7]). Their appearance does not seem to result from the sudden conversion of a less noxious germ at the moment a disease sets in; rather, they are believed to be already present in the host at that time and to have an environmental origin.

That saprophytic fungi may occasionally acquire a propensity to develop pathogenic strains has been shown recently by Sachsenweger[35] in three children in whom a severe granulomatous infection resulted from the subconjunctival injection of a contaminated sodium chloride solution. However, as we do not know whether this actually might occur with C. mycoderma, the presence of this mold in our untreated patients, though seemingly important, should not be overestimated.

## Summary and Conclusions

During the last five years, cases of a peculiar type of corneal ulceration have been observed in increasing numbers in the central agricultural areas of Argentina. The lesion appears as a neatly circumscribed, irregularly round ulcer, which is always confined to the outermost layers of the stroma, has a grayish, dry surface, and cannot be stained with fluorescein or methylene blue.

Since the clinical picture is in keeping with that of some well-known forms of ocular fungus infection, a tentative diagnosis of keratomycosis was made. The laboratory findings, however, are not yet of the kind upon which such a diagnosis could be definitely predicated. Although direct microscopic examination of the scrapings was invariably negative, a yeastlike mold of the Candida genus was grown regularly in Sabouraud's medium from patients not previously treated. A diagnosis of C. mycoderma resulted from further mycologic studies. As this organism is considered to play the part of a potential pathogen, and as, in so far as we know, it has never been mentioned as the cause of ocular disease, we feel that any final opinion as to its possible role in the production of the condition reported would be premature.

In spite of the ineffectiveness of both local and systemic administration of many chemotherapic and antibiotic agents, and of the ingestion of large doses of potassium iodide, the prognosis is good, in that practically complete recovery ensues in a few weeks as a result of repeated scraping of the ulcer followed by topical applications of trichloracetic acid or iodine tincture.


*Casilla de Correo 301.*

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# INTRAVENOUS SEDATION IN CATARACT SURGERY

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*Louisville, Kentucky*

The usual methods of producing sedation and analgesia in patients who are to undergo cataract surgery are quite satisfactory in a majority of instances. Administration by mouth of one of the barbiturates, or a substitute such as promethazine hydrochloride (Phenergan) when barbiturates are contraindicated, and intramuscularly of meperidine hydrochloride (Demerol) and chlorpromazine hydrochloride (Thorazine), usually brings to the operating room a patient who is quiet, relaxed, and not apprehensive, who does not want to be a "bad actor." Local anesthesia and akinesia are obtained by instillation of a local anesthetic, infiltration, and retrobulbar injection of Novocaine (four percent) or Xylocaine (two percent) containing six units of hyaluronidase per cc., so that the patient cannot feel pain and could not squeeze his eye if he wanted to. In addition the intraocular pressure is reduced to a subnormal level—a condition earnestly desired for the removal of cataract.

There remains, however, a sizable group of patients who are not good candidates for such a procedure and for whom some type of general anesthesia is necessary. In this group are those extremely apprehensive people who are likely to be recalcitrant, or "bad actors," the deaf and psychiatric patients.

Ordinary general anesthetics including intravenous Pentothal are unsatisfactory for

obvious reasons and we have been reluctant to adopt curare although it has some desirable effects and is widely used.

Stimulated by simultaneous reports in June, 1955, by two groups of British authors on the use of intravenous sedation with Thorazine in intraocular surgery, we began to use, in selected cases, the method advocated by them. The results were eminently satisfactory. We have since used the method, with minor alterations, in a series of 70 operations for cataract. Age of the patients ranged from nine to 84 years.

The method consists in the intravenous injection of a mixture containing Thorazine, Phenergan, and Demerol in 25 cc. of normal saline. The British authors recommended 50 mg. of Thorazine, 50 mg. of Phenergan, and 100 mg. of Demerol in the mixture. In one report, the average fall of blood pressure was 55 mm. Hg with a maximum of 135 mm. Hg. In the other report, there were two patients whose blood pressure fell from 250 mm. Hg to between 70 and 90 mm. Hg. Early in our experience with the method there were two patients who had drop of blood pressure of 58 and 50 mm. Hg. Thereafter we reduced the amount of Thorazine in the mixture to 25 mg.

## Technique

### Preoperative medication

The evening before operation the patient is given 1.5 gr. of Seconal. This dose is repeated the next morning two hours before surgery. One hour preoperatively Demerol (50 to 75 mg. depending upon size and sex, usually 50 mg. to women and 75 mg. to men) and Scopolamine (gr. 1/300) are administered.

In the operating room the following mixture is given intravenously:

| | Mg. | Mg. per cc. |
|---|---|---|
| Thorazine | 25 | 1 |
| Phenergan | 50 | 2 |
| Demerol | 100 | 4 |
| Normal saline q.s. | 25 cc. | |

It is administered slowly, not more than one cc. per minute until the patient falls asleep, usually snoring peacefully. Five minutes later the usual injections for anesthesia and akinesia are given, following which gentle, steady pressure is applied over the globe for at least five minutes. Thus, approximately 13 minutes elapses between starting administration of the mixture and beginning the operation. Oxygen, one liter per minute, is administered underneath the drapes.

## Effects

### During surgery

The patients were completely relaxed, mentally and physically, and slept peacefully throughout the operation. There was no sign of apprehension or anxiety. They would answer to a loud voice, but, with one exception, would not execute any movement. The exception was a man, aged 50 years, who persisted in rolling his head, even though he received the maximum dose of mixture, 13 cc. Later it was learned that during his only previous surgery, repair of a lacerated hand, he had also reacted poorly to the anesthetic. In no other patient was there any response to operative procedures.

### In the postoperative period

The patients slept quietly, with an average awakening time of three and one-half hours, when they would arouse momentarily and return to sleep for the greater part of the day. They required a minimum of medication for pain, 44 percent receiving none and 34 percent only one dose during the first 24 hours. Three patients complained of nausea and two of them vomited one time each.

## Anesthetic aspects

In preoperative medication Seconal was used for its mild sedative action plus the protection it afforded against Novocaine reaction; Demerol for its analgesic effect and Scopolamine primarily for drying of secretions, although it also is a mild cerebral de-

pressant. No case was disturbed by flow of saliva. Toward the end of this series the use of Scopolamine was discontinued because salivary secretion was sufficiently reduced by the other drugs. Oxygen was administered in an effort to provide the average poor risk with adequate oxygenation since there were numerous cardiac, hypertension, and diabetic patients in the study. There were no instances of respiratory embarrassment. It was not necessary to use an airway, although occasionally the anesthesiologist had to elevate and support the patient's chin.

Thorazine (chlorpromazine hydrochloride) is a powerful and widely used drug with a variety of pharmacologic effects, those useful in ophthalmic surgery being: (1) sedative and hypnotic, (2) antiemetic, (3) hypotensive, (4) muscle relaxant, and (5) potentiative to other drugs.

Phenergan (promethazine hydrochloride) also is: (1) sedative and hypnotic, (2) antiemetic, and (3) muscle relaxant.

Demerol (meperidine hydrochloride) is a: (1) powerful analgesic, (2) mild sedative, and (3) antispasmodic.

The average dose required was 6.8 cc., the smallest being 2.0 cc. and the largest 13 cc. Thus the average dose of the various drugs in the mixture was Thorazine 6.8 mg., Phenergan 13.6 mg., and Demerol 27.2 mg. The production of such a thoroughly satisfactory degree of sedation from such small amounts of these drugs was most gratifying.

The only side-effect of significance encountered was a fall in blood pressure in two cases amounting to 50 and 58 mm. Hg, respectively. After the amount of Thorazine in the mixture was reduced from 50 mg. to 25 mg. no fall of blood pressure greater than 36 mm. Hg occurred, the average drop being 22 mm. Hg. In those cases in which a fall of blood pressure was imminent the anesthesiologist administered neosynephrine (0.2 cc.) intramuscularly. In four instances it was necessary to repeat this dose.

## Summary

The use of Thorazine, Phenergan, and Demerol as suggested provides a method of intravenous sedation for cataract surgery which is safe, satisfactory, and easy of administration.

It produces ideal conditions for surgery.

It minimizes discomfort in the immediate postoperative period.

It is useful in patients of all ages and states of health, and is especially desirable in recalcitrant, apprehensive, deaf, or psychiatric patients.

*Heyburn Building (2).*

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## Ophthalmic Miniature

Dr. E. Schneider of Copenhagen died recently. His ophthalmic table was made up from frozen sections of the normal eye.

News Item in Am. J. Ophth., **4**:947, 1921.

# SECONDARY GLAUCOMA FOLLOWING OCCLUSION OF THE CENTRAL ARTERY OF THE RETINA*

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*Ann Arbor, Michigan*

It is very common for the ophthalmologist to see cases of secondary "hemorrhagic" glaucoma developing about two or three months following the occlusion of the central retinal vein. This type of glaucoma represents a serious complication and is notoriously difficult to treat. The nature of hemorrhagic glaucoma following venous occlusion is not completely understood. However, the proliferation of vascular connective tissue in the area of the chamber angle seems to be its direct mechanical cause. Paralleling this proliferation of endothelium and connective tissue in the angle of these cases is the development of thin-walled blood vessels on the anterior surface of the iris (rubeosis iridis). Further development of the disease process often leads to complete angle closure by peripheral anterior synechias.

While the above picture is a commonly described clinical and pathologic finding following venous occlusion, its occurrence secondary to central retinal artery occlusion seems to be very rare, as there are few publications of such cases. Duke-Elder[1] and Sommers[2] both mention this type of secondary glaucoma as a rarity. It seems to be accepted, however, that secondary glaucoma following arterial occlusion does represent a typical entity. Opin[3] and Teng[4] emphasize that this condition is probably by no means as rare as most ophthalmologists believe. Our own observation of two such cases within a year would seem to support this opinion.

This paper represents the clinical and histopathologic demonstration of a typical case of secondary glaucoma following occlusion of the central artery of the retina.

* From the Eye Clinic and the Laboratory for Neuropathology and Neuro-ophthalmology of the University of Michigan Hospital. Supported by the U. S. Department of Public Health, Education, and Welfare, grant No. B-475 (C4).

## Case history

This is the case of an 84-year-old white man who gave a history of a sudden painless loss of vision in the left eye in February, 1956. The patient related the incident to striking the eye with a bunch of grapes while working in a vineyard. Being otherwise asymptomatic and pain free he unfortunately did not visit an ophthalmologist at that time. Some months following the sudden visual loss the eye became painful and red. After a few months of increasingly severe symptoms, the patient was finally seen by an ophthalmologist in northern Michigan and was referred to this University Hospital on October 23, 1956.

The examination at that time revealed visual acuity of 20/200, O.D., and nil, O.S. The right eye exhibited an advanced senile cataract but appeared otherwise normal. The fundus of the right eye could not be seen clearly because of the cataract. The intraocular pressure was 27.7 mm. Hg, O.D. (Schiøtz). The left eye exhibited tearing, lid edema, photophobia, severe conjunctival and ciliary injection, and a large central corneal ulcer. There was a small hypopyon. The iris showed secondary inflammation and an early stage of rubeosis. There was a dense senile cataract which obscured the fundus picture. The intraocular pressure was stony hard.

Diagnosis was made of central corneal ulcer, O.S., amaurosis, O.S., rubeosis iridis, O.S., secondary glaucoma, O.S., and senile cataracts, O.U. On October 24, 1956, an enucleation, O.S., was performed. The postoperative course was uneventful.

## Method of histologic examination

The enucleated eye was immediately injected with 10-percent formalin. After imbedding in paraffin, serial sections were cut to include nervehead, fovea, and central cornea. These sections were stained with hematoxylin-eosin.

## Histologic findings

The eye was of normal size. The macroscopic examination revealed a central corneal ulcer, a deep anterior chamber, an advanced cataract, and an extensive excavation of the optic disc. The vitreous was liquefied. On microscopic examination the corneal epithelium was largely missing. There was a deep corneal ulcer centrally with necrosis of

corneal lamellae and dense leukocytic infiltration. Descemet's membrane and the corneal endothelium were preserved. There was dense infiltration and hyperemia of the perilimbal conjunctiva. Groups of leukocytes and exudate were attached to the posterior corneal surface. There were numerous free leukocytes and mononuclear cells in the anterior chamber.

The chamber angle was deep and filled with inflammatory cells. The structure of the trabecular system was very dense and Schlemm's canal was virtually obliterated (fig. 1). There was an acute iritis. The iris also exhibited numerous new-formed, thin-walled blood vessels on its anterior surface (fig. 2). The ciliary body was diffusely infiltrated with mononuclear cells and showed atrophy and hyalinization. The retina revealed almost complete degeneration of both the nerve fiber layer and the ganglion cell layer (fig. 3). Peripheral cystoid degeneration was present but there were no retinal hemorrhages.

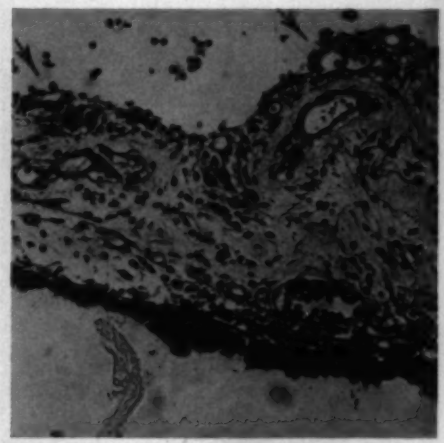

Fig. 2 (Wolter and Liddicoat). High-power view of a part of the iris. The iris shows inflammatory infiltration and there are free inflammatory cells at its anterior surface. There are many newly formed, thin-walled blood vessels on the anterior surface of the iris (arrows).

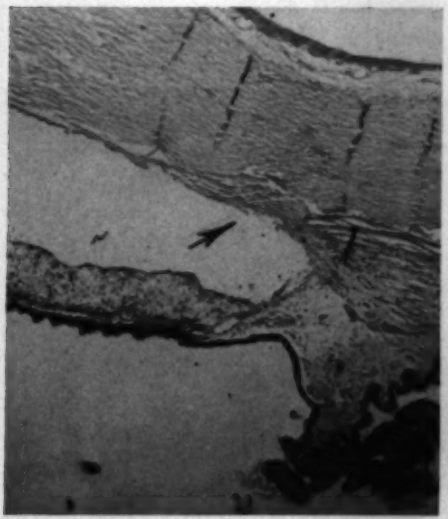

Fig. 1 (Wolter and Liddicoat). Low-power view of the peripheral cornea, the angle, the iris, and the ciliary body. The structure of the trabecular system is dense and the canal of Schlemm is virtually obliterated (arrow). The ciliary body is atrophic and the ciliary processes are hyalinized.

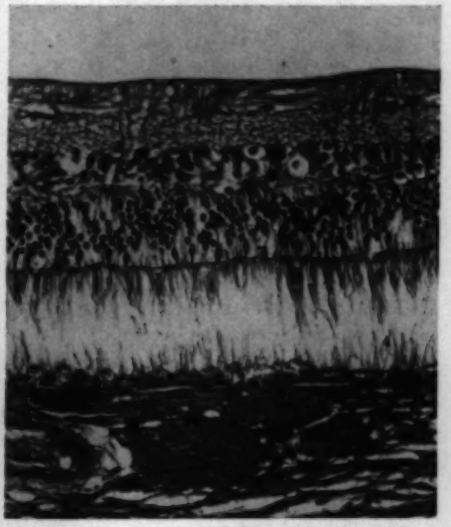

Fig. 3 (Wolter and Liddicoat). High-power view of a part of the retina of the posterior pole. There is complete atrophy of the two inner layers—the nerve-fiber layer and the ganglion-cell layer. The outer retinal layers are rather well preserved. The pigment epithelium, the choroid, and the sclera are normal.

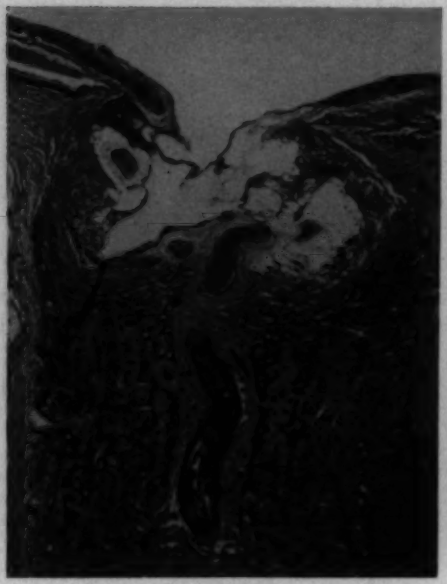

Fig. 4 (Wolter and Liddicoat). Low-power view of the optic nervehead. There is extensive cavernous atrophy. The artery shows occlusion by the detached and curled-up intima (arrow). The central vein is open.

Fig. 5 (Wolter and Liddicoat). High-power view of the central retinal artery. The muscle layer is well visible. The hypertrophic intima is detached and represents a curled-up mass in the lumen of the artery (arrow). There is partial recanalization.

The optic nerve showed very interesting histologic findings. There was extensive cavernous atrophy of the anterior part of the nervehead and marked degeneration of the body of the nerve (fig. 4). The central artery in an area directly behind the lamina cribrosa was obstructed by a mass of curled up layers of tissue (fig. 5). This contained flat cells and obviously represented the hypertrophic and detached intima of this artery. This peculiar obstruction of an artery by the dissected intima is commonly called "dissecting aneurysm." There was partial recanalization of the artery in the area of obstruction. The central vein was fibrotic but its lumen was of normal width and was filled with blood (fig. 6).

The pathologic diagnosis was: central cor-

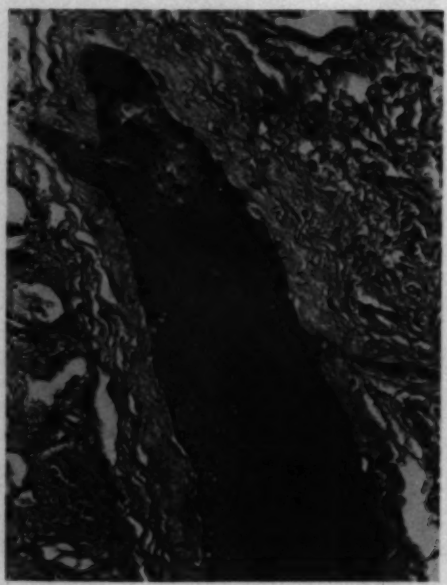

Fig. 6 (Wolter and Liddicoat). High-power view of the central retinal vein. The wall of the vein is fibrotic. But the lumen is open and filled with blood.

neal ulcer secondary to long-standing bullous keratitis in a case of secondary glaucoma following occlusion of the central retinal artery by "dissecting aneurysm."

## Comments

Only five clinically and pathologically well-documented cases of secondary glaucoma following central retinal artery occlusion were found in the literature. A sixth case will soon be reported by Teng. These six cases all had very similar clinical histories and pathologic findings. This demonstrates that secondary glaucoma following central retinal artery occlusion represents a distinct clinical entity.

The first complete case of secondary glaucoma following central retinal artery occlusion was published by Opin,[3] that of a 72-year-old man who suddenly lost vision in the right eye without pain. The typical ophthalmoscopic picture of arterial occlusion with edema of the retina and macular cherry-red spot was seen. Four weeks following the sudden loss of vision glaucoma developed and the eye was enucleated. Histologically the clinically observed occlusion of the central retinal artery was confirmed. Degeneration of the inner layers of the retina and formation of a fibrovascular membrane in the chamber angle were found. The angle was closed by peripheral anterior synechias.

Later cases of Bussola[5] (one case) Benton[6] (two cases), Teng[4] (one case), and Wolter and Lubeck[7] (one case) were very similar to this first case of Opin. The ages of the patients at the time of the arterial occlusion were between 49 and 73 years. Extensive arteriosclerosis was found in all cases and arterial hypertension in two cases. The occlusion of the central artery was diagnosed clinically and confirmed histologically in all these cases. In no case was primary glaucoma found in the unaffected eye before or after the arterial occlusion in the other eye. None of the eyes with glaucoma following arterial occlusion had a history of primary glaucoma. Secondary glaucoma occurred in these cases between four and 10 weeks following the occlusive episode (sudden loss of vision). There is no doubt that this condition differs basically from secondary central retinal artery occlusion following primary glaucoma, as described by Verhoeff.[8]

The case presented in this paper was not seen by an ophthalmologist during the period in which a clinical diagnosis could have been made. However, it must be emphasized that initially the patient was blind but without pain and that only later did pain and irritation occur.

The pathologic findings leave no doubt that this case represents a typical occlusion of the central retinal artery. The central retinal vein was normal and the retina showed the classical type of degeneration following arterial occlusion. The histologic findings in the anterior segment are characteristic of those long associated with "hemorrhagic" glaucoma secondary to central retinal vein occlusion, that is, bullous keratitis, proliferation of the fibrovascular tissue in the angle, and rubeosis iridis. We now know that these changes are also typical of secondary glaucoma following central retinal artery occlusion.

This case gives no further insight into the basic etiology of the anterior segment changes, but there can be little doubt that the proliferation of fibrovascular tissue in the chamber angle represents the direct mechanical cause of the increased pressure. The usual explanation of rubeosis and fibrovascular proliferation following venous occlusion, that of development of venous collaterals, is obviously not tenable following arterial occlusion.

It is interesting to note that both of our cases revealed a so-called dissecting aneurysm as the cause of the obstruction of the central retinal artery.* Garron[9] recently published an extensive study about this

*Another case of this entity with a complete history was seen clinically and histologically after this paper was already in print. It also exhibited occlusion of the central artery of a dissecting aneurysm.

peculiar involvement of the central retinal artery. The question whether the occurrence of this dissecting aneurysm together with that of the secondary glaucoma in both of our cases is just coincidence or not is open for further studies.


## Summary

The clinical findings and the histopathology of the eye in a case of secondary glaucoma following occlusion of the central artery of the retina by dissecting aneurysm are described. This case is compared to five other cases of the same entity which were published earlier in the literature. There can be no doubt that secondary glaucoma following occlusion of the central artery represents a typical disease entity. The cause and development of the secondary glaucoma in this entity is not yet understood.


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# VISUAL AIDS IN OFFICE PRACTICE*

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The purpose of this report is to encourage the use of visual aids in office practice.

The great value of visual aids in properly selected patients has been established beyond question.[1-13] The considerable variety of visual aids now available and the expense of acquiring many of these make it impossible for the average ophthalmologist to maintain a complete set in his office. However, the majority of partially seeing patients can be tested quite adequately with a rather small number of optical aids. The following report will present a recommended list of visual aids for office use together with their cost and source of supply.

Emphasis is placed on those items which, in addition to being useful, are inexpensive. Often a simple magnifying device costing a dollar or two will prove to be more useful to the patient than expensive lenses costing $100.00 or more.

The items to be recommended have all been in use in my private office practice, and these plus many others have been used by me at the Visual Aids Clinic, University of North Carolina Hospital.

## Types of visual aids

Visual aids can be divided for purposes of discussion into six general categories: (1)

* Presented in part at the 16th clinical meeting, Wilmer Residents' Association, Wilmer Ophthalmological Institute, The Johns Hopkins Hospital, Baltimore, April 6, 1957.

Standard refraction procedures with modifications, (2) telescopic lenses, (3) microscopic lenses, (4) illuminated magnifiers, (5) nonilluminated magnifiers, and (6) miscellaneous, including projection readers and nonoptical aids.

### 1. Standard refraction procedures

This is the single most useful visual aid. For the partially sighted patient emphasis is placed on strong reading glasses and high bifocal adds. Standard bifocal adds (Ultex B) up to +20D. and higher have been successfully prescribed,[14] and adds of +10 to +15D. are fairly commonplace.† Binocular vision can be achieved with adds up to +8.0 to +10D.; when adds of this strength are prescribed in a bifocal, attention must be paid to proper decentration as outlined by Fonda.[14] Refraction can often be simplified in these patients by placing the vision chart five to 10 feet from the patient; a movable stand for this purpose has been devised at the Industrial Home for the Blind in Brooklyn, New York. The standard Snellen distant vision chart has one 20/200 letter and two 20/100 letters with no intermediate gradations. It is quite helpful to use instead a chart such as the Bausch and Lomb H-356 which has six gradations of letters from 20/109 to 20/200 (fig. 1). Routine use of the retinoscope will save much time in many of these patients.

In testing near vision the usual reading card contains print no larger than 20/60 size (J10). Special near-vision cards with considerably larger print are most helpful, such as those prepared by Visual Press (fig. 2). The near-vision cards prepared by Louise Sloan at the Wilmer Institute (fig. 3) are a valuable aid in the rapid selection of the proper lens.[13] In deciding on the final lens strength to be prescribed, I often use a telephone directory as well as a newspaper, since these types of reading material are the most likely to cause trouble. A lens which gives adequate magnification for reading print on a clearly printed reading card is often inadequate for reading newsprint or telephone numbers of identical size, and a stronger lens may be required. When the patient's vocation requires the reading of a certain kind of print, such as a rate schedule, it is important to have him bring this along at the time of testing.

In many of the standard trial lens sets available today the lenses in the range of +10 to +20D. have small apertures. Partially sighted patients often have nystagmus or eccentric fixation and find it somewhat difficult to locate the aperture in these lenses. It is helpful and time-saving to have a few


Fig. 1 (Tillett). Standard Snellen chart (left) is inadequate for testing the partially sighted patient. B & L chart #H-356 (center) is a valuable aid because of the several gradations of letters from 20/109 to 20/200. The Feinbloom chart (right) is occasionally helpful.


Fig. 2 (Tillett). Visual Press reading cards #301 and #302 (left and center) are very helpful in testing the partially sighted. Standard reading card (right) is often inadequate.

† High bifocal adds can be obtained on special order from the American Optical Company.

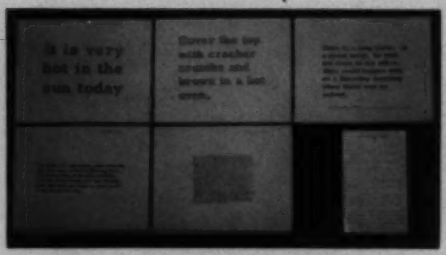


Fig. 3 (Tillett). The Sloan reading cards are exceedingly valuable in the rapid selection of the correct visual aid. Depending on which card can be read at 20 or 40 cm., the lens strength required for reading 1.0 M size print is instantly determined. At bottom right a standard reading card is shown for comparison.

trial lenses in the stronger dioptric range with large apertures. For this purpose the weaker lenses in the Volk trial set can be used (+15 and +20D.). Or the ophthalmologist may desire to acquire a few large-aperture trial lenses, such as +10, +15, and +20D. plano-convex lenses which can be prepared by A-O in a standard No. 1801 trial ring at moderate cost (fig. 4).

### 2. Telescopic lenses

Some practitioners consider telescopic lenses as synonymous with visual aids. This is unfortunate because telescopic lenses are among the less useful visual aids. Except for the bifocal type telescopes (made by Univis or Keeler), the patient must usually be stationary in order to wear telescopic lenses. They may be helpful to the student in the classroom, and may afford some pleasure in viewing movies, television, and sporting events. For these purposes the German sports binoculars (DeWohler) ×3.5 and the Japanese sports binoculars (Lemont) ×2.5 are useful and inexpensive (fig. 5). The Kollmorgen telescopic lens is one of the best when a prescription telescope is to be used. It is preferable to have available the large Kollmorgen trial set, since this allows for binocular testing of distance vision. An occasional patient will find some use for the stronger monocular telescopes, ×6 to ×10.

### 3. Microscopic lenses

These are among the most useful visual aids for the patient with very low vision. It should be emphasized that they are for monocular use only. Numerous trial sets of microscopic lenses are now available, including the Volk, Feinbloom, I-Gard, Policoff, Keeler, and A-O sets. There is undoubtedly difference of opinion as to which set or sets are best.

To meet the requirements of the majority of low vision patients a set of microscopic lenses should range from ×4 (+16D.) up to ×15 (+60D.). Of the microscopic trial sets now available it is the author's opinion that two are superior—the Volk conoid trial set and the Feinbloom microscopic trial set. The Volk conoid set provides correction in a wide range of lenses (+15D. to +100D.) with a minimum of distortion; the weight of these lenses is somewhat greater than in the Feinbloom lenses. The Feinbloom micro-

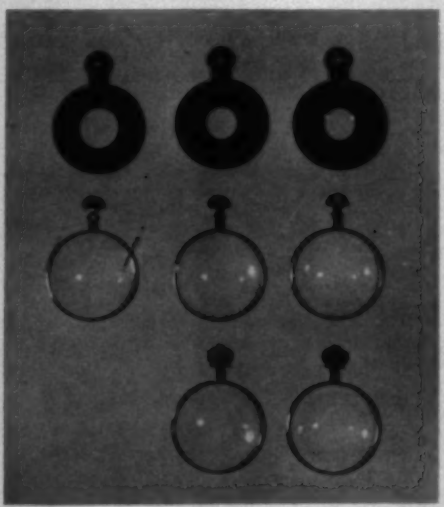

Fig. 4 (Tillett). Standard trial lenses +10 to +20D. (top row) are harder to use by the partially sighted because of smaller aperture. Large diameter trial lenses (middle row) may be obtained to facilitate the examination. Or trial lenses such as in the Volk trial set +15 and +20D. (bottom row) can be used.

scopic trial set has lenses from ×4 to ×20 (by steps of ×2); they are relatively light.

The I-Gard hyperocular trial set (plastic, aspherical, ×4 to ×8) gives excellent correction at a reasonable cost and with a minimum of distortion, but these lenses do not come in powers greater than ×8. Where the feature of a bifocal is required, the Keeler bifocal microscopic lens (×4 to ×15) or the Policoff bifocal microscopic lens (×3 to ×14) can be prescribed. The A-O microscopic trial set is useful and moderate in cost, but is not now available in powers above ×10. The A-O ×10 lens is a bifocal microscope and we have found it useful; in powers of ×6 and ×8 our patients have usually preferred one of the other types of microscopic lenses such as the I-Gard, Feinbloom, or Volk.

### 4. Illuminated magnifiers

Where illumination is an important factor, magnifiers with a built-in light source may prove very helpful. The flawfinder ×10 is a very useful device and quite inexpensive. The Adisco ×5 is likewise very useful (fig. 6). The Keeler trial set of illuminated magnifiers is very good and we have found an occasional patient who preferred it over all magnifiers. For this purpose I have preferred the Keeler illuminated spectacle magnifier set (LVA 5), using it as a hand magnifier rather than attached to a spectacle frame. The Keeler illuminated hand magnifier set (LVA 4) has a slightly wider field, but our patients requiring ×12 or higher magnification have found this set unsatisfactory due to inadequate illumination, for the magnifying lens blocks the light source. In all of the above illuminated magnifiers the patient may find it convenient to use the long-life mercury battery.*

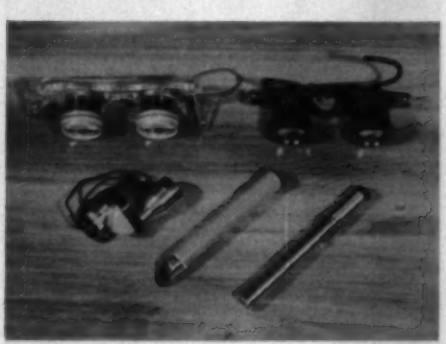

Fig. 5 (Tillett). Inexpensive telescopic lenses: German (DeWohler) sports binoculars ×3.5 (top left) and Japanese (Lemont) sports binoculars ×2.5 (top right). Monocular telescopes ×6 to ×10 (below) are occasionally useful.

Fig. 6 (Tillett). Inexpensive illuminated magnifiers: Adisco (top) and Flawfinder (bottom).

### 5. Nonilluminated magnifiers

It is through the use of hand magnifiers that the ophthalmologist can often do the most good at the least cost. It is unfortunate that the selection of a magnifier is sometimes left to the optician, because the variety of magnifiers maintained by the average optician is inadequate and confined to the weaker powers (+5.0D. to +10D.). If the ophthalmologist desires to have the optician demonstrate magnifiers to the patient, the ophthalmologist should make certain the optician (1) has a wide variety of magnifiers, particularly in the strong powers (+20D. and higher); (2) understands the importance of having a bright light on the reading material; and (3) understands the necessity

* May be obtained from Keeler Optical Products.

Fig. 7 (Tillett). A variety of hand magnifiers and loupes should be kept in the office. The above group ranges from +5.00D. to +80D.

of having the patient hold the reading material close.

It is desirable that the ophthalmologist maintain a selection of magnifiers in his office (fig. 7). Magnifiers of +5.0D. to +10D. are of value to the patient with slight visual loss. The average low-vision patient, however, requires far more strength than this and has often sought in vain for a sufficiently strong lens. The B & L folding double and triple lenses ×6, ×8, ×10, and ×20 are indispensable equipment to many patients, enabling them to look up phone numbers and read menus with relative ease. The plano-convex lens ×2, though low in power, has great light-gathering properties and is very useful (fig. 8). The plasta ×5 magnifier (McLeod Optical Company, hand or stand model) is remarkably free of distortion and is light; in elderly patients with unsteady hands the stand model may be helpful. The precoptic ×9 and ×12 (Edmunds Scientific Company) provides still higher magnification; the plastic base ×6 magnifier (Edmunds Scientific Company) is useful and very inexpensive. The magnifocuser No. 10 (×2.5) gives binocular vision and is helpful when visual impairment is not great. The ophthalmologist will find it helpful to have available a set of watchmaker's loupes (+8.0 to +33D., Selsi Company, which can be easily slipped in front of the patient's glasses and cost only 60 to 85 cents. In patients in whom there is uncertainty concerning the usefulness of a strong lens, there is no reluctance to recommend an inexpensive loupe or hand magnifier, whereas the more expensive microscopic glasses might be prescribed with much hesitation.

### 6. Miscellaneous

This includes projection readers such as the Megascope ×12 and ×25 and the A-O reader ×3 and ×5. The projection readers are rather cumbersome to use. In our experience the A-O reader has insufficient magnification to be of much value; the Megascope will occasionally help when all other magnifiers fail.

Of considerable importance are certain nonoptical items (fig. 9). These include the "Selector" variable density dark glasses, side shields, visors, multiple pinhole discs, and


Fig. 8 (Tillett). The plano-convex magnifier ×2 has light-gathering properties which make it a valuable aid.

pinhole clipons. The "Glass-gard" eye glass holder is useful for holding on telescopic sports binoculars securely.

### Recommended aids for office practice

In office practice it is desirable to have items from each of the above six categories (fig. 10). In the list which follows it should be noted that a good selection of strong magnifiers can be obtained for about $135.00. For those on a limited budget this group of magnifiers will certainly benefit the greatest number of patients at the least cost to the doctor or the patient.

Trial sets constitute the biggest expense in visual aids work, but this can be limited by the judicious selection of certain sets. A microscopic trial set is essential for adequate visual aids testing. Either the Volk set or the Feinbloom set is recommended. The Feinbloom microscopic lens set can be obtained for $190.00, including all lenses from ×4 to ×16 (by steps of ×2) but eliminating the ×18 and ×20 which are optically unsatisfactory. Although it is more expensive, I prefer the Volk trial set ($295.00) because it is optically superior in strengths of +60D. and higher.

A trial set of telescopic lenses, though not essential, is helpful. The Kollmorgen set is one of the most useful and the large trial set is to be preferred ($117.00).

Fig. 9 (Tillett). Aids which decrease light: Patient wearing Seelector variable density glasses with visor and side shields.

Fig. 10 (Tillett). The group of recommended visual aids, including a microscopic trial set and a telescopic trial set, can be easily placed on a rather small table.

The Keeler illuminated spectacle magnifier trial set LVA5 ($131.00) is very useful and should be considered a desirable optional item. It is useful primarily as a hand magnifier rather than in a spectacle frame, but can be used in either manner. The Keeler illuminated hand magnifier set (LVA4) is not recommended due to its inadequate lighting system in the higher powers of magnification.

### Discussion

It should be emphasized that motivation is extremely important in the patient's acceptance of a visual aid. If a patient has strong motivation, has a visual acuity of 5/200 or better, and does not have a markedly constricted visual field, he will usually derive considerable benefit from visual aids. In our experience motivation has been best in young and middle-aged patients and has been poor in the elderly patient. In office practice the ophthalmologist is likely to use these devices at the outset in elderly patients with senile macular degeneration and related conditions. The elderly patient with inflexible reading habits often does not tolerate these strong lenses; his reading vision may be improved considerably but he simply will not accept the unaccustomed reading dis-

## TABLE 1

### RECOMMENDED VISUAL AIDS

| Magnifiers | Where Obtained | Approximate Cost |
|---|---|---|
| *Illuminated Magnifiers* | | |
| Flawfinder ×10 | American Foundation for the Blind, 15 W. 16th Street, New York, New York | $5.35 |
| Adisco (interchangeable model) | American Foundation for the Blind, 15 W. 16th Street, New York, New York | 9.85 |
| *Telescopic lenses* | | |
| Japanese sports binoculars ×2.5 | American Foundation for the Blind, 15 W. 16th Street, New York, New York | 9.50 |
| German sports binoculars ×3.5 (reading caps available for above binoculars if desired) | American Foundation for the Blind, 15 W. 16th Street, New York, New York | 26.20 |
| *Nonilluminated Magnifiers* | | |
| Plastic cataract reader ×5, handle model | American Foundation for the Blind, 15 W. 16th Street, New York, New York | 6.75 |
| Plastic cataract reader ×5, stand model | American Foundation for the Blind, 15 W. 16th Street, New York, New York | 6.75 |
| Plano-convex magnifier ×2 | American Foundation for the Blind, 15 W. 16th Street, New York, New York | 5.40 |
| B & L folding ×20 | American Foundation for the Blind, 15 W. 16th Street, New York, New York | 2.45 |
| B & L folding ×10 | American Foundation for the Blind, 15 W. 16th Street, New York, New York | 2.00 |
| B & L folding ×8 | American Foundation for the Blind, 15 W. 16th Street, New York, New York | 2.15 |
| B & L folding ×6 | American Foundation for the Blind, 15 W. 16th Street, New York, New York | 2.75 |
| No. 10 Tripod magnifier ×8 | American Foundation for the Blind, 15 W. 16th Street, New York, New York | 0.85 |
| No. 10 Magni-focuser | American Foundation for the Blind, 15 W. 16th Street, New York, New York | 8.00 |
| Pre-cop-tic, clear base, ×9 (cat. #30,057) | Edmund Scientific Co., Barrington, N. J. | 8.50 |
| Pre-coptic, clear base, ×12 (cat. #30,055) | Edmund Scientific Co., Barrington, N. J. | 10.00 |
| Clear base magnifier, ×6 (cat. #60,044) | Edmund Scientific Co., Barrington, N. J. | 0.75 |
| Pocket Magnifier, German +11D. (Cat. #402) | Selsi Company, Inc., 29 E. 22nd St., N. Y. | 1.05 |
| Magnifier 1¼" diam., +11D. (cat. #429) | Selsi Company, Inc., 29 E. 22nd St., N. Y. | 0.15 |
| Watchmaker's Loupes, clip-on, 1" diam. (cat. #445 (focal lengths 1.5", 2", 2.5", 3", 3.5", 4", and 5") at 60¢ to 85¢ each) | Selsi Company, Inc., 29 E. 22nd St., N. Y. | 4.75 |
| B & L rectangular magnifier +5.0D. (#81-33-79) | Bausch and Lomb, Rochester, New York | 2.70 |
| *Miscellaneous* | | |
| Seelector variable density glasses | American Foundation for the Blind | 3.15 |
| B & L distant chart H-356 | Bausch and Lomb, Rochester, New York | 1.00 |
| Near vision cards #301 and #302 (@$2.00) | Visual Press, P.O. Box 184, Northridge, Calif. | 4.00 |
| Sloan reading cards | Louise Sloan, Johns Hopkins Hosp., Baltimore, Md. | 10.00 |
| Side shields #115 A (large leaf) | Watchemoket Optical Co., Providence 3, R.I. | 1.20 pr. |
| Visors | Nu-Vue Visor Co., 1917 11th St., Des Moines 14, Ia. | 0.40 ea. (4.75 doz.) |
| "Glass Gard" eye glass holder (for use with sports binoculars) | Precision-Cosmet Co., 529 S. 7th St., Minneapolis 15, Minn. | 0.65 ea. (7.50 doz.) |
| Total cost—magnifiers, etc. (exclusive of trial sets) | | $136.30 |

| Trial sets | Where Obtained | Approximate Cost |
|---|---|---|
| I. Microscopic trial sets (not necessary to obtain both) | | |
| (a) *first choice* Volk conoid microscopic trial set +15D. to +100D. | American Bifocal Co., 1440 St. Clair Ave., Cleveland 14, Ohio | $295.00 |
| (b) *second choice* Feinbloom microscopic trial set ×4 to ×16 | Wm. Feinbloom, Ph.D., 130 E. 74th St., New York 21, N. Y. | $190.00 |
| II. Telescopic trial set | | |
| Kollmorgen Telescopic Trial Set (large ×2.2 and ×1.7 combination set) | Kollmorgen Optical Corp., Northampton, Mass. | $117.00 |
| III. Illuminated magnifier trial set | | |
| Keeler illuminated spectacle magnifier trial set (LVA 5) | Keeler Optical Products, 617 S. 52nd St., Philadelphia 43, Pa. | $131.00 |
| Total Cost of Trial Sets (varies depending on which microscopic set is obtained)— | | $438.00 to $543.00 |

tance. The exception is the patient who is young in spirit and incentive despite a more advanced chronological age. The ophthalmologist who judges his results on the basis of elderly patients alone may become discouraged. The same can be said of patients with vision less than 5/200 and those with marked limitation of visual field, as in retinitis pigmentosa.

The ophthalmologist will find his most gratifying and sometimes truly remarkable results in the younger, more strongly motivated age group. Patients with congenital cataract who have had surgery, familial macular degeneration, myopic degeneration, microphthalmos—these are among the conditions frequently benefited. Many patients with albinism can be helped simply with high bifocal adds. High school and college students are particularly good patients and we have found case workers for the blind (many of whom are themselves partially sighted) to be excellent patients.

It should be pointed out that many patients will require more than one visual aid. For example, the individual who uses a Volk conoid +40D. lens for reading may enjoy carrying a B & L folding ×10 magnifier in his pocket for looking up telephone numbers or reading menus. And he may enjoy a pair of DeWohler sports binoculars for watching a football game.

## Examining time

A few further remarks will be made regarding the time required for a visual aids examination. It is sometimes stated that several hours are required for such an examination.[9] I have not found this necessary. With experience, testing time can be reduced markedly. If every patient were tested with every visual aid available, the time consumed would be considerable. But a patient who comes in with a vision of 5/200 will seldom be helped by any of the weaker magnifiers. The doctor can proceed at once to test with the strongest microscopic lenses.

Some patients require a careful manifest refraction, particularly the aphakics and the high myopes. But oftentimes the doctor can determine with a sweep of the retinoscope that no significant refractive error is present and can begin testing at once with telescopes, magnifiers, and microscopic lenses. An albino may achieve adequate improvement with a +10D. bifocal add and require no further testing.

Where the patient or doctor is in doubt as to the value of a magnifying device, it is extremely helpful to let the patient borrow the lens or lenses for a few days' use. This is infinitely more satisfactory in determining the worth of the magnifier than spending considerable time in the office.

In general, the secret to rapid selection of the proper lens is to determine early the power of magnification required to give satisfactory reading vision. The Sloan reading cards give this information with considerable accuracy in a minimum of time (fig. 3). For example, if it is determined that a patient requires a +40D. (×10) lens to read the size print required in his vocation, the doctor's only remaining decision is how best to prescribe this strength magnification—that is, Volk or Feinbloom +40D. microscopic lens, A-O microscopic bifocal ×10, hand magnifier (B & L ×10 folding or Precoptic ×9), or illuminated magnifier (flawfinder ×10). We have found it helpful to label each magnifier with its dioptric strength or magnifying power for easy reference. With experience and familiarity in the use of these devices, the ophthalmologist can select the proper lens with considerable ease.

## Summary

1. A list of recommended visual aids for office use is presented with their cost.

2. A good selection of magnifiers, exclusive of trial sets, can be obtained at relatively low cost (about $135.00).

3. A microscopic trial set is essential for adequate visual aids testing. The Volk conoid trial set is recommended.

4. An illuminated magnifier trial set and a telescopic trial set are desirable, though not essential. The Kollmorgen telescopic trial set and the Keeler illuminated spectacle magnifier trial set (LVA 5, not the LVA 4) are recommended.

5. Visual aids are accepted best in patients with strong motivation, with vision of 5/200 or better, and without extreme constriction of the visual field.

6. With experience the examining time can be reduced markedly.

7. The optician often has an incomplete selection of magnifiers; the ophthalmologist should therefore have available in his office a variety of strong hand magnifiers.

8. The ophthalmologist should become familiar with the value of visual aids or he may lose considerable patient confidence.

*1511 Scott Avenue (3).*

I wish to acknowledge helpful ideas gained from discussions or personal communications with a number of individuals interested in this field, including Charles Ritter at the American Foundation for the Blind; Louis Bettica, George Hellinger, and Leo Esbin at the Industrial Home for the Blind; Richard Hoover and Louise Sloan at the Wilmer Institute; and James E. Lebensohn discussing the work at the Chicago Lighthouse for the Blind. The co-operation of H. A. Wood, North Carolina State Commission for the Blind, is appreciated.

The visual aids recommended in this report do not necessarily represent those which would be selected by the above-named individuals.

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# RAEDER'S PARATRIGEMINAL SYNDROME*

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In 1924, Raeder[1] reported five cases of ocular sympathetic paralysis, which he differentiated from Horner's syndrome of ptosis, miosis, apparent enophthalmos, ocular hypotony, and facial anhidrosis. Raeder's patients manifested ptosis and miosis but had no change in sweating on the face. In each case the most outstanding clinical symptom was severe headache in the trigeminal distribution. One patient had trigeminal neuralgia, two had trigeminal motor paresis, and trigeminal hypesthesia was noted in three. Furthermore, the II cranial nerve

* From the Wilmer Ophthalmological Institute of The Johns Hopkins University and Hospital.

was involved in two patients, IV and VI in one, and III, IV, and VI in another. Raeder's first patient was demonstrated at autopsy to have a meningioma involving the left Gasserian ganglion and internal carotid sympathetic plexus; no lesion was found on histologic examination of the cervical sympathetic chain. The second patient died but no post mortem was obtained. Of the remaining three patients, two had craniocerebral trauma and one presented trigeminal neuralgia. All of the five patients were males—aged 18, 65, 48, 28, and 48 years. Previous reports[2,3] of three cases of gunshot wounds of the head producing similar symptoms were noted. Raeder concluded that cases with coincident oculopupillary sympathetic paralysis and trigeminal symptoms represented lesions which could be "localized to a limited space, the situation of which justifies the designation of 'paratrigeminal' paralysis of the sympathetic."

Since then only two reports[4,5] of this condition have been found in the English literature. Aneurysmal dilatation of the internal carotid arteries was early suspected as the cause, but Walsh[6] and Ford[7] found normal arteriograms in some of these patients. Because of the rarity of reports of Raeder's syndrome and the importance of its differentiation from Horner's syndrome, a review of those cases seen in The Johns Hopkins Hospital is presented.

## Material

From 1925 to 1952, in The Johns Hopkins Hospital, the diagnosis of Raeder's syndrome or paratrigeminal syndrome was recorded in 28 patients and Horner's syndrome in 77 others. A review of these records, as well as available cases through September, 1957, revealed eight acceptable cases of Raeder's paratrigeminal syndrome. Ford[7] estimates that two or three times as many cases have been seen in the past 25 years but, as diagnoses are not coded on out-patients, the clinical notes are not available for review. Analysis of the records of the accepted cases reveals the following data:

All eight patients were males, with an age range of 32 to 60 years, averaging 46 years. Three patients had a diagnosis of migraine headaches made over 20 years prior to onset of the present illness, and another patient had suffered from recurrent headaches for eight years. Onset of Raeder's syndrome was accompanied by severe, daily, recurrent headaches lasting from two weeks to two years but subsided within three months in five patients. Hypertensive cardiovascular disease was present in four (50 percent) of the patients.

The oculosympathetic paresis was on the left side in three, and on the right side in four patients. Visual acuity, fields, and fundus examinations were normal in each instance. Tonometry revealed a slightly lower intraocular pressure on the ipsilateral side in four patients (one scale unit Schiøtz in three cases, and four units in one case). Corneal reflexes were intact in all cases.

All had severe headache, usually in the first and second divisions of the trigeminal but occasionally radiating into the third division. This was unilateral without exception and recurred at the same time of day in two cases. Epiphora was noted in the affected eye of two patients. Sweating was intact on both sides of the face in all but one patient.

Follow-ups, obtained in six patients, averaged over two years. On follow-up examination the episode of intense headache was found to have cleared within a few weeks, as a rule, but, although ptosis and miosis had become less noticeable, these conditions were present in each instance when measured with the millimeter rule.

## Case reports

### Case 1

G. M. (#544308), a 49-year-old white man, was admitted to the hospital on November 22, 1956, with a chief complaint of left frontoparietal headaches of seven weeks' duration. At the onset the pain was a constant, steady ache, which was also felt in the left eye. Superimposed on this

constant ache was a frequent stabbing pain lasting 10 to 15 seconds and occurring several times an hour. Four weeks prior to admission he noted ptosis of the left upper lid. One week prior to admission his physician noted miosis on the left and advised hospitalization. No change in sweating on the face was present.

General physical examination revealed: Blood pressure, 136/86 mm. Hg; other than for the eyes, no abnormalities were noted. Chest roentgenograms showed an old healed fibrocalcific lesion at the left apex. To exclude the possibility of a pancoast tumor or other lesion producing a Horner's syndrome, laminograms of the left upper chest, bronchograms, and repeated sputum cultures for tubercle bacilli were made and were negative. X-ray studies of the skull, cervical spine, and a left carotid arteriogram were all within normal limits. Hemogram, urinalysis, serologic test for syphilis, serum calcium, phosphorus, NPN, blood sugar, and serum proteins were normal.

Ophthalmologic examination revealed ptosis of the left upper lid and a miotic pupil on the left but no other abnormalities. Visual acuity, fields, and ophthalmoscopy were completely normal. The corneal reflexes were intact. Neither four-percent cocaine nor 1:1,000 adrenalin dilated the left pupil.

On examination eight months later, the patient stated that the headaches had cleared for the most part within one month after discharge from the hospital but that he still had an occasional left-sided headache. An interesting finding was that he noted some increased viscosity of tears in the left eye following the episode.

The right palpebral aperture measured 9.5 mm., and the left 8.0 mm. The right pupil was 3.0 mm., and the left 2.0 mm. In a relatively dark room, the right pupil measured 4.0 mm. and the left 3.0 mm. No trigeminal hypesthesia was present and the corneal reflexes were intact.

Tension measured 12 mm. Hg on the right and 10 mm. Hg on the left (Schiøtz; 1955 scale). Accommodative amplitudes were equal in the two eyes. Partial recovery was noted in that cocaine diminished the amplitude in the affected eye as well as in the normal eye, although not as markedly, and the left pupil dilated much more slowly than the right to cocaine. Clinical impression was Raeder's paratrigeminal syndrome, left.

### Case 2

W. S. (#597566), a 39-year-old white man, was admitted on February 8, 1952, with a complaint of right frontotemporal headaches of three weeks' duration. The pain radiated from the right temporal region and in the right eye, to the base of the neck, and into the right third division. The pain was intermittent, lasting one to two hours at a time, and recurred about twice daily. Pain would often recur at about 11 o'clock each morning. Ptosis and miosis developed on the right but no change in sweating on the face and no disturbance in vision occurred.

General physical examination revealed: Blood pressure 120/80 mm. Hg and no abnormalities but for ptosis and miosis on the right. X-ray studies of the skull and sinuses revealed a small area of radiolucency in the right frontal bone, near its juncture with the greater wing of the sphenoid. The radiology department considered this a cholesteatoma in all probability. A right carotid arteriogram revealed that the main trunk of the internal carotid artery had a somewhat tortuous loop at the base of the neck just before entering the cranium but this was not thought to be of significance. The right carotid arteriogram appeared normal. Ophthalmologic examination revealed an oculosympathetic palsy on the right and no other abnormalities. Vision, fields, and fundi were normal.

On follow-up examination five and one-half years later, the patient reported that he had had no headaches following the arteriogram and that thereafter he had enjoyed perfect health. Examination revealed the right palpebral aperture to be 10 mm., and the left 11 mm. The right pupil measured 2.0 mm., and the left 3.5 mm. Both reacted normally to light. Visual acuity, fields, slitlamp examination, and ophthalmoscopy were all normal. Tension measured 5.0 mm. Hg (Schiøtz) in the right eye, and 10 mm. Hg in the left. The accommodative amplitude was equal in the two eyes, and the right pupil dilated much more slowly to cocaine than the left. Impression was Raeder's paratrigeminal syndrome, with complete clinical recovery except for minimal residual ptosis and miosis on a five-year follow-up.

### Case 3

W. D. (#104624), a 40-year-old white man, was seen September 22, 1957, complaining of right-sided headache, ptosis, and miosis of three months' duration. At the age of 19 years he noted the onset of unilateral headaches which recurred about every two months since. These headaches first involved the right supraorbital region and, although always unilateral, had involved the left side at times. The longest symptom-free interval during the past 21 years was the 18 months prior to onset of the present illness. Headaches then became present almost daily, usually occurring in the afternoons but at times awakening him between midnight and 2:00 A.M. The pain lasted from 15 minutes to four hours and was throbbing and definitely pulsatile in nature. Nausea was occasionally present but he had vomited only once during the episodes.

Two months before entry he noted ptosis of the right upper lid. The ptosis fluctuated in degree, becoming more marked about 30 minutes before a headache. At times the right upper lid would droop but no pain would ensue. The pain was primarily in the eye but spread over the first and second divisions on the right. Occasionally the pain had radiated into the jaw, teeth, and to the occiput and neck on the right. The patient did not believe a change had occurred in the character of the headaches he had had for so many years, only that they

were now more severe and frequent. He had noted that the left side of his face perspired more profusely than the right. Hot fluids produced freer perspiration on the left side of the face than prior to the present illness. Past history was noncontributory. Family history was negative but for headaches of mild degree in his mother. His blood pressure had been normal.

Ophthalmologic examination revealed 20/15 vision in both eyes; tension measured 8.7 mm. Hg (Schiøtz) on the right and 10 mm. Hg on the left. The right palpebral aperture was 8.5 mm., and the left 9.5 mm. The right pupil was 3.0 mm., and the left 4.0 mm. Small beads of perspiration were noted on the left forehead but none on the right, although the latter felt slightly damp to touch in a hot room. Corneal reflexes were intact. Accommodative amplitudes were equal in both eyes. One hour after instillation of cocaine and adrenalin in both eyes, the right pupil measured 3.5 mm. and the left 7.5 mm. Chest X-ray studies, barium enema, gastro-intestinal series, and skull films were normal. Impression was Raeder's paratrigeminal syndrome, with a history of migraine.

CASE 4

J. B. (#467007), a 64-year-old white man, had rather frequent headaches all of his life, even as a boy, but these were reasonably mild and occurred only about once weekly until March 2, 1953. At that time, a very severe left temporal headache suddenly appeared, radiating into the left eye, up to the left parietal area, and down into the left maxilla. This was "like a real hard toothache" and was pounding in nature. Some dizziness, dysarthria, and dysphagia were noted but cleared rapidly. A tendency to fall to the left was noted. Tearing of the left eye accompanied the headache but no rhinorrhea.

With onset of the severe headaches in 1953, ptosis of the left upper lid developed. No change in sweating was noted on the face. The headaches persisted daily for two years and then began to become less severe; they were present on follow-up examination in 1957. They are now aggravated by stooping, coughing, sneezing, or laughing.

Past history revealed that severe hypertensive cardiovascular disease had been present for years, with an average blood pressure of 200/130 mm. Hg. X-ray studies suggested aneurysmal dilatation of the thoracic aorta and perhaps innominate artery.

Ophthalmologic examination June 28, 1957, revealed 20/20 vision in both eyes. The right palpebral aperture measured 7.0 mm., and the left 6.0 mm. The right pupil was 4.5 mm. and the left 2.5 mm. Corneal reflexes were intact bilaterally. External examination, biomicroscopy, and visual fields were normal. Ophthalmoscopy disclosed only deep physiologic cups and grade 1 to 2 hypertensive retinopathy. Accommodative amplitudes were equal in the two eyes. Impression was Raeder's paratrigeminal syndrome, left; hypertensive cardiovascular disease; and history of migraine.

CASE 5

E. L. (#451580), a 45-year-old white man, was admitted February 17, 1948, with a complaint of headaches of 15 years' duration. In 1933, he noted the onset of pain in the left temple and deep in the left eye after a submucous resection. At that time the pain came on abruptly, lasting 40 to 60 minutes per attack, with such episodes recurring about every two weeks. Initially, the attacks occurred almost exclusively in the evening, with only an occasional one by day. The pain was deep in the eye and radiated over the left first trigeminal division. Eight years prior to entry, the headaches began to occur during lunch. Three years prior to entry, the headaches increased in severity, frequency, and duration. He noted paresthesias on the face before onset of the pain.

The pain now lasted two to three hours, was present at least once a night, and two or three such episodes per night might occur. It was rare for the patient to go through a night without pain. The pain was steady and sharp and boring in nature. The left nostril became congested at the onset of the pain, and the conjunctival vessels of the left eye became injected. Epiphora was noted on the left. When the pain subsided, the nasal congestion and lacrimation would cease almost immediately. No visual aura was noted. The patient noted that he perspired a little more on the left forehead than on the right but noted no relationship between sweating and pain. Vomiting was a rare occurrence.

Two years prior to entry, he was seen at the Mayo Clinic. Miosis was noted on the left at that time and this had not varied since. The patient took histamine subcutaneously for 14 months but stated that this controlled his pain for the first three months only and after that there was no effect. He had found that pressure on the temporal artery would at times minimize the discomfort. No pain had occurred on the right side of the face.

On general physical and neurologic examination, the blood pressure was 120/74 mm. Hg and all findings were within normal limits but for the left eye. Ophthalmologic examination revealed the right palpebral aperture to be 10 mm., and the left 9.0 mm. The right pupil was 4.0 mm., and the left 3.0 mm. Cocaine dilated the right pupil promptly, the left scarcely at all. Corneal sensitivity was intact bilaterally and sweating was present on both sides of the face. Vision, external examination, biomicroscopy, visual fields, and ophthalmoscopy were normal. Skin resistance studies showed a normal pattern on both sides of the face. X-ray studies of the chest and skull were negative. Impression was Raeder's paratrigeminal syndrome with history of migraine.

Nine years later, the patient wrote that he was in good health and having only very infrequent headaches.

CASE 6

J. F. (#689685), a 57-year-old white man, was seen on November 16, 1954, complaining of head-

aches of 15 years' duration and ptosis of the right upper lid of one-month duration. He stated that 15 to 20 years previously, he developed recurrent headaches which ran a typical course. Bouts would occur lasting four to six weeks during which he had headache recurring almost every day. The headaches occurred "so regularly that you could set your watch by them." At 2:00 to 3:00 P.M. each day, suffusion and tearing of the left eye, with left frontotemporal pain would begin. The pain, lasting for about 30 minutes, would recur daily at just about the same time for two or three weeks. He would then be free of pain for two or three months when another cycle of pain would recur. In the next cycle, the headaches might come on at night but again would recur at the same time daily.

The headache was a violent throbbing pain in the left temple with tearing of the eye and nasal congestion on that side. No visual phenomena and no nausea occurred. The patient was free from headaches from April, 1953, until September, 1954. Then pain recurred but now affecting the right side. Ptosis of the right upper lid developed. No difference in sweating was noted at any time. This episode lasted about two weeks and the patient had no further headaches.

On examination June 25, 1957, he was quite firm that he had had no headaches at all in over two years and none of significance since the episode in November, 1954. Numbness in the legs had been noted in 1956. General physical examination revealed a labile blood pressure varying between 165/100 and 136/84 mm. Hg. Minimal signs, suggesting alcoholic polyneuropathy, were considered equivocal by other observers. Family history revealed that one sister had migraine.

Ophthalmologic examination June 25, 1957, revealed the corrected vision to be 20/40 in the right eye and 20/20 — 4 in the left. The right palpebral aperture measured 6.0 mm. and the left 9.0 mm. The right pupil was 2.0 mm., and the left 3.0 mm. Corneal reflexes were intact and, except for incipient lens changes, no other abnormalities were noted. Ophthalmoscopy was within normal limits. Accommodative amplitudes were equal in the two eyes.

Laboratory data revealed: Cholesterol 280 mg. percent; glucose tolerance test, normal; hematocrit, 45, sedimentation rate, 31 mm./hr., with a normal WBC and differential. Stool was guaiac negative; serology was negative. X-ray studies of skull, orbits, and optic foramina were normal. Impression was: (1) Raeder's paratrigeminal syndrome, right; (2) history of migraine; (3) alcoholic polyneuropathy, minimal signs in lower extremities.

### Case 7

B. H. (#557111), a 58-year-old white man, was admitted November 20, 1950, with a chief complaint of pain above the left eye for four or five weeks. The patient had not been subject to headaches previously and this was a new experience for him. The pain varied in severity but never ceased completely. No disturbance of vision was noted. General physical examination revealed: Blood pressure, 150/100 mm. Hg, arteriosclerotic cardiovascular disease, and obesity. Neurologic examination revealed only slight ptosis of the left upper lid, and slight miosis on the left. Vision, fields, and fundi were normal. Corneal reflexes were intact. No tenderness of the temporal arteries was noted. Routine laboratory studies were normal. Chest X-ray studies revealed an elongated aorta but no other abnormalities. Impression was Raeder's paratrigeminal syndrome, left.

Two years later he was readmitted with cardiac decompensation. He noted that the previous headaches had cleared rapidly and had not returned. Slight residual miosis remained and the left pupil dilated to a lesser degree than the right in reduced light. Impression on discharge was: Raeder's syndrome with residual miosis; hypertensive cardiovascular disease with congestive failure; auricular fibrillation; history of angina pectoris; and obesity.

### Case 8

L. E. (#531380), a 42-year-old white man, was admitted October 13, 1950, complaining of headaches of eight years' duration. He had noted generalized headaches at two- to three-week intervals for eight years prior to admission, which were relieved by aspirin. However, six weeks before entry, daily severe headaches began, associated with an infection of the left ear. The headaches were diffuse and not sharply localized. No nausea, vomiting, or other symptoms occurred. The patient was said to be tense and irritable at the onset of his headaches. General physical and neurologic examination revealed blood pressure to be 150/100 mm. Hg and no changes but ptosis and miosis on the right. There was no change in color of the face and no temperature or moisture difference on the face. Skin resistance studies revealed a normal facial pattern. Vision and fields were normal. Hematocrit was 43, sedimentation rate 4.0 mm./hr., and WBC, 5,700. Chest and skull X-ray studies were normal. Impression was Raeder's paratrigeminal syndrome, right.

## Discussion

This study emphasizes that Raeder's paratrigeminal syndrome not only has localizing significance but also is a definite clinical entity. It has characteristic features in the history, examination, X-ray studies, and prognosis that warrant its differentiation from Horner's syndrome. This differentiation is at times difficult and yet is of great clinical importance.

Horner's syndrome consists of miosis, ptosis, relative ocular hypotonia, apparent enophthalmos, and a lack of sweating on

the affected side of the face. It is characteristically painless. Such a clinical picture can be produced by a lesion situated anywhere along the sympathetic pathway from the hypothalamus to the sympathetic fibers innervating facial sweat glands. In many instances the presence of an isolated Horner's syndrome is of serious medical significance. A review of 77 cases of Horner's syndrome seen in The Johns Hopkins Hospital from 1932 to 1952 reveals two important facts: (1) the multiplicity of lesions which may cause this syndrome; and (2) the poor prognosis of many of these lesions. If one excludes those cases caused by trauma and occurring postoperatively (as in the Blalock-Taussig procedure, radical neck dissections, and stellate ganglionectomy), then the cases of Horner's syndrome seen in this hospital assumed major significance. The guarded prognosis of a silent Horner's syndrome is emphasized by listing the histologically proven causes (table 1).

TABLE 1

HISTOLOGICALLY PROVEN LESIONS CAUSING HORNER'S SYNDROME

(The Johns Hopkins Hospital)

| |
|---|
| Pancoast tumors |
| Mediastinal neoplasms |
| Lymphomas |
| Carcinoma of pancreas |
| Wallenberg's syndrome (posterior inferior cerebellar artery occlusion) |
| Basilar artery thrombosis |
| Rhabdomyosarcoma of neck muscles |
| Substernal thyroid |
| Syphilitic aneurysms of innominate artery |
| Metastatic Ewing's sarcoma |

Raeder's syndrome is a clinical picture in which ptosis and miosis suddenly appear coincident with a typical but severe unilateral head pain. This pain is usually in and around the eye. Sweating is characteristically intact on the ipsilateral side of the face. Analysis of the cases here reported reveals other features of Raeder's syndrome. It is more common in males. In the records to which I have had access,* males have predominated by a 7:1 ratio. The average age in this series is 46 years. There is frequently a history of long-standing hypertensive vascular disease or migraine. In patients with migraine, however, there is definitely a marked change in the frequency and severity of the headache with onset of this syndrome.

Although sweating is usually intact in these patients, some changes in sweating may be elicited by a meticulous history of this point. There may be an increase in sweating on the affected side for a short period after onset, or there may be a small area of hyperemic, sweating skin in the supraorbital area.[7] Epiphora of the affected eye is not uncommon. A late change in viscosity of tears was noted by one patient—tears became more viscous on the affected side. In some of these cases in which skin resistance studies on the face were obtained, symmetry of facial sweating was confirmed. This should not be unexpected if one recalls that in Raeder's syndrome the sympathetic interruption is peripheral to those fibers accompanying the external carotid to the face. On the other hand, in those cases of Horner's syndrome similarly studied, marked unilateral anhidrosis was revealed.

Six of the eight cases of Raeder's syndrome here reported have been followed for an average of approximately four years; each has recovered symptomatically, usually within three months. Of the remaining two cases, a follow-up could not be obtained in one and the other patient only recently developed the disease.

Arteriograms were formerly obtained in patients with Raeder's syndrome. Tortuous aortas were noted in some instances but the significance of this is undetermined. The arteriograms were reported normal in each instance. At present, the benign prognosis of Raeder's syndrome is considered so characteristic that arteriography is not done in the initial work-up of these patients.[8] If the symptoms do not clear within two or three

* Dr. F. R. Ford and Dr. W. P. McInnis have each brought to my attention a case of Raeder's syndrome in a woman.

TABLE 2

DIFFERENTIAL DIAGNOSIS OF RAEDER'S PARATRIGEMINAL AND HORNER'S SYNDROMES

| | Horner's Syndrome | Raeder's Paratrigeminal Syndrome |
|---|---|---|
| Age | Any age | 30–60 (average = 46 years) |
| Sex | Males = females | More frequent in males |
| Hypertension | No history | Often a history |
| Migraine | No history | Often a history |
| Unilateral Headache | Absent | Present |
| Sweating on face | Absent (affected side) | Intact |
| Accommodation | Increased amplitude On affected side | Equal amplitude On both sides |
| Corneal reflex | Intact | May be decreased |
| Duration | Longer | Pain usually clears in few months |
| Prognosis | Guarded (unless due to trauma or surgery) | Excellent |

months, arteriography may be advisable. Although Raeder's first case was due to a meningioma, no subsequent case due to a neoplasm has been found. No patient has died of this entity in this hospital. The history and clinical course suggest a vascular mechanism. However, the transitory nature of the disease has prevented the pathologic demonstration of its cause, and the etiology of Raeder's syndrome remains unknown.

The ease with which this syndrome may be missed clinically should be emphasized. Anisocoria in these patients is often minimal and is almost nil in a brightly lighted examining room. If one darkens the room, however, the miotic pupil is much more noticeable as the normal pupil dilates. The relative narrowing of the palpebral fissure is often so slight that one should invariably record this measurement with a millimeter rule on the two sides. Corneal sensitivity should be studied in these patients, as it is normal in Horner's syndrome but may be diminished in Raeder's syndrome. A careful neurologic examination with roentgenograms of the skull, cervical spine, and chest are important in ruling out more alarming causes of Horner's syndrome. A thorough history is essential in this diagnosis. A history of trauma, thoracic surgery, hypertension, or migraine is of particular value. The character, location, frequency, and nature of the pain should be noted.

The measurement of the amplitude of accommodation is helpful in differentiating Raeder's paratrigeminal syndrome from Horner's syndrome. Six cases of Horner's syndrome have been studied on the Badal optometer and, in each instance, Cogan's[8] reported 0.5 to 1.5 diopter increase in accommodative amplitude in the ipsilateral eye in Horner's syndrome has been confirmed. Both eyes of five patients with Raeder's syndrome have been studied, as well, and, in each instance, the accommodative amplitude was equal in the two eyes. The significance of these accommodation studies will be the subject of another publication.

A comment might be made as to terminology in these cases. Horton[9] recently commented upon the occurrence of Horner's syndrome in patients he diagnosed as having histamine cephalgia. Ciliary neuralgia of Harris[10] and Symonds type of migraine[11] have subjective pain similar to that in Raeder's syndrome. It is possible that Dr. Horton's cases are similar to those mentioned in this report and that the only difference is in terminology.

Table 2 may aid in differentiating Raeder's paratrigeminal syndrome from Horner's syndrome.

## SUMMARY

1. Eight cases of Raeder's paratrigeminal syndrome seen in the Johns Hopkins Hospi-

tal in the past 25 years are reported.

2. The importance of differentiating Raeder's paratrigeminal syndrome from Horner's syndrome is stressed. The criteria for doing this are presented.

*The Johns Hopkins Hospital (5).*

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# RETINOBLASTOMA*

## With intracranial extension masked by trauma and anterior chamber hemorrhage: Report of a case


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The recognition of advanced retinoblastoma is frequently difficult and may be obscured by a history or findings not solely related to the presence of the tumor. According to Reese[1] retinoblastomas have an affinity for invading nerve tissue and a predilection for invasion of the optic nerve bundles. If the tumor extends beyond 10 mm., which is rare, it usually gains access to the subarachnoid space, where the central retinal vessels leave the nerve. If the tumor extends this far, it may spread to the chiasm and brain. The size of the tumor in the globe appears to bear no relationship to its spread into the optic nerve. Herm and Health[2] report a decrease in involvement of the optic nerve by the tumor beyond the lamina cribrosa from 41 percent before 1930 to 21 percent since 1930. This corresponds with a similar decrease noted by Reese in recent years and is attributable to earlier recognition and less delay in treatment of the condition.

The following case is being reported because of the wide dissemination of retinoblastoma and the clinical masking of the diagnosis by a history of trauma resulting in an anterior chamber hemorrhage.

### Case report

J. H., history number 157418, a five-year-old Negress, was referred to McPherson Hospital on May 30, 1956, with the chief complaint of swollen, painful right eye.

History revealed that the patient had been struck in the right eye with a shoe thrown by a sibling three weeks prior to admission. Marked swelling of the right eye was noted following this and progressed until admission. The child was admitted to the hospital with the diagnosis of traumatic anterior chamber hemorrhage of the right eye and possible retinoblastoma.

Physical examination revealed a poorly developed and nourished, colored female child weighing 10 kg. and measuring 95 cm. Examination other than the eyes was not remarkable. The right eye showed


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marked chemosis, eversion of the lower lid, and pronounced exophthalmos. The globe appeared immobile. The anterior chamber was filled with blood and the cornea was deeply blood stained. Details of the anterior chamber could not be made out and the fundus was not seen. The eye was soft to palpation. The left eye appeared normal throughout; the fundus was well seen and was not remarkable.

Laboratory examinations revealed a normal hemogram. Urinalysis showed a faint trace of albumin and numerous white cells.

Examination under general anesthesia the day following admission revealed no enlargement of the liver, kidneys, adrenal glands, or spleen. The eye examination revealed the changes previously noted in the right eye and normal ophthalmoscopic findings in the left eye. Enucleation was advised in view of the severe damage to the eye and the possibility of malignancy.

Enucleation was performed on June 1, 1956, and, at operation, pockets of laudable pus were found within Tenon's capsule. The globe was removed with little loss of blood, and a large amount of necrotic tissue was removed from the orbit. The patient had been noted to be rather lethargic at the time of induction of anesthesia and had a generalized convulsion following enucleation. This responded to oxygen and sedation. From June 1 to 8, 1956, 0.5 gm. streptomycin and 400,000 units of penicillin were administered daily. The patient remained afebrile but listless and ate poorly.

On the night of June 9th she became very restless, would not respond to stimuli, had irregular respirations, a horizontal nystagmus of the left eye, and a moderately dilated pupil. The patient remained in this condition for about two hours following which she regained some muscle tone with twitching of the right side of the face and right hand.

Lumbar puncture on June 10th yielded a slightly cloudy fluid with an initial pressure of 350 mm. of $H_2O$. There were 1,000 cells which could not be differentiated, a four-plus Pandy, and the total protein was 1.45 gm. percent. Bacterial smear and culture of spinal fluid were negative. The patient was seen by a pediatrician in consultation; and the diagnoses entertained were brain abscess, meningitis by extension from the orbital abscess, and cavernous sinus thrombosis.

The patient's course was progressively downhill in spite of massive doses of antibiotics. A second lumbar puncture on June 13th yielded an almost milky fluid under very little pressure. There was a total count of 7,400 cells. These were so disintegrated that they could not be differentiated. The consulting pediatrician arranged to have the patient transferred to Duke Hospital on June 14th. The patient had almost continuous convulsive seizures following admission there, and tracheotomy was required to maintain a patent airway. Right frontal and parietal trepanations were done with ventricular punctures which revealed clear fluid under markedly elevated pressure. Ventricular punctures were repeatedly done in an effort to control the pressure. In spite of these heroic measures the patient died on June 17th.

### Eye pathology report

The eye measures 22 by 21 by 20 mm. and is of normal shape. Attached to the temporal side of the globe and extending posteriorly to the optic nerve is a hard, rubbery, tissue mass. On section the anterior chamber is filled with dark red blood. The vitreous is filled with a solid cheeselike material and the choroid appears to separate a smaller mass measuring 3.0 by 6.0 mm. inferiorly (fig. 1).

Sections of the globe show the anterior chamber to be filled with red blood cells and small dark cells containing large basophilic nuclei with scant cytoplasm. A fibrous membrane which originates in each angle of the anterior chamber extends across the pupillary opening. Over the iris are sheets of small dark cells containing large basophilic nuclei. Similar cells infiltrate the atrophic ciliary body. There is no normal retina present in the sections and the whole vitreous cavity is filled with a mass composed of small cells of the type seen in the anterior

Fig. 1 (Egleston, McPherson, and Perry). Gross view of globe, showing anterior chamber hemorrhage and intraocular retinoblastoma with extraocular extension (×10).

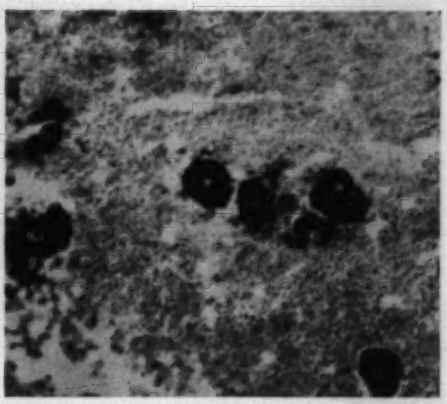

Fig. 2 (Egleston, McPherson, and Perry). Areas of calcification in tumor (×470).

chamber and over the iris. The cells are packed tightly in many areas, and in other areas there is necrosis of the mass in which the nuclei stain lightly. Just posterior to the lens are several areas of calcification in residual retina (fig. 2). The entire choroid is replaced by cells similar to those described previously, and in one area of remaining retina there is marked rosette formation (fig. 3). A stump of extraocular muscle attached to the globe shows diffuse infiltration with these same cells. In some areas the small dark staining cells invade and involve the entire scleral thickness, and the optic nerve beyond the lamina cribrosa is diffusely infiltrated. Impression: Retinoblastoma with rosette formation and extraocular extension.

### Autopsy findings

The significant findings were limited to the central nervous system and the right orbital space. Two surgical wounds were present in the scalp, one in the right frontal and one in the right temporal region, and trephine openings in the calvarium were beneath these wounds. The brain weighed 1,130 gm. The right optic nerve was two times the size of the left optic nerve which was normal. As the right optic nerve neared the optic chiasm it was incorporated in a rounded mass 2.5 cm. in diameter located in the region of the hypothalamus (fig. 4). The mass was not related to the pituitary, and when the brain was sectioned coronally the mass was seen to project into the third ventricle.

Histologically, the mass was a very cellu-

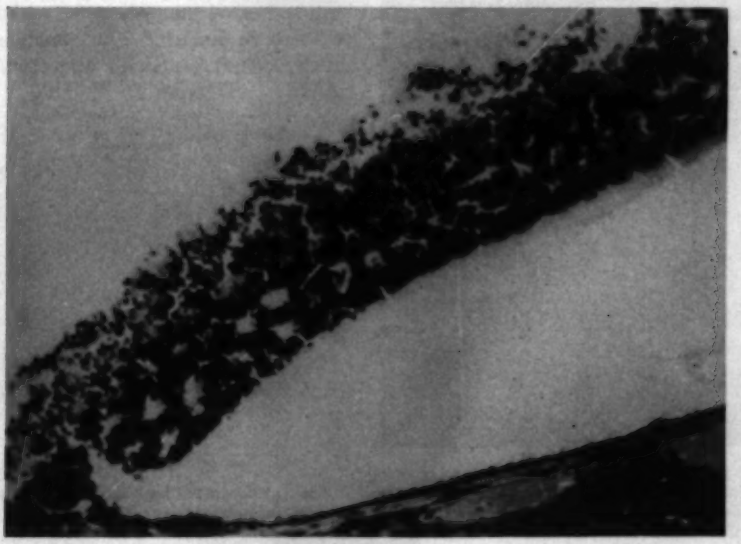

Fig. 3 (Egleston, McPherson, and Perry). Rosette formation (×470).

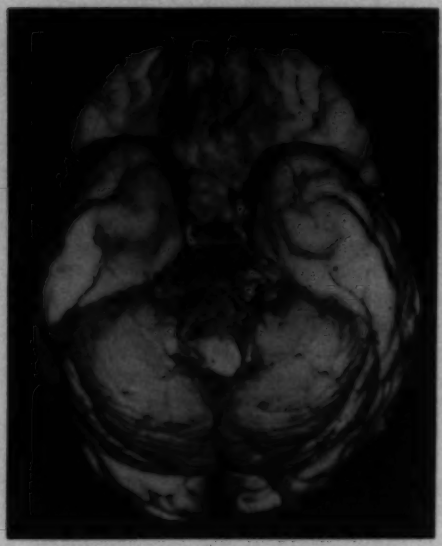

Fig. 4 (Egleston, McPherson, and Perry). Right optic nerve near chiasm incorporated in a round mass.

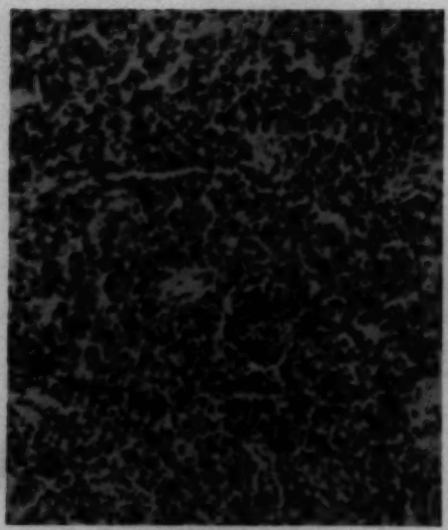

Fig. 5 (Egleston, McPherson, and Perry). Sections of mass surrounding right optic nerve, showing a cellular tumor composed of cells with small round nuclei and scant cytoplasm (×120).

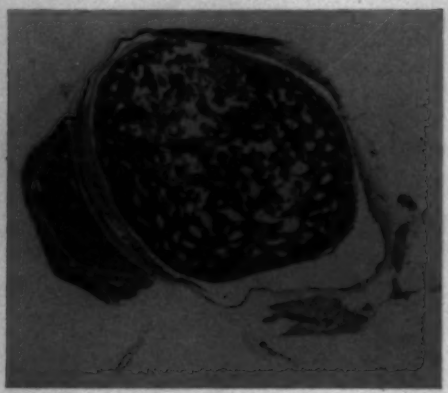

Fig. 6 (Egleston, McPherson, and Perry). Replacement of right optic nerve by tumor (×20).

lar tumor being made up of small round nuclei with very scant cytoplasm (fig. 5). The nuclei were hyperchromatic, contained large clumps of chromatin, and showed variation in size and abnormal mitotic activity. The cells generally were irregularly arranged; however, an occasional rosette formation was found. Areas of necrosis and foci of calcification were present.

Infiltrating tumor gave the leptomeninges a diffuse milky appearance and produced scattered small punctate white nodules up to two mm. in diameter. The ependymal lining of the lateral ventricles was studded with

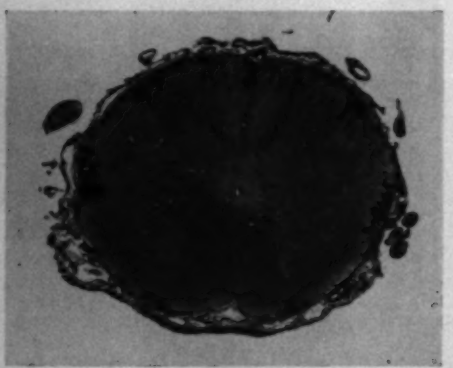

Fig. 7 (Egleston, McPherson, and Perry). Meningeal infiltration with tumor cells in the upper cervical cord (×8).

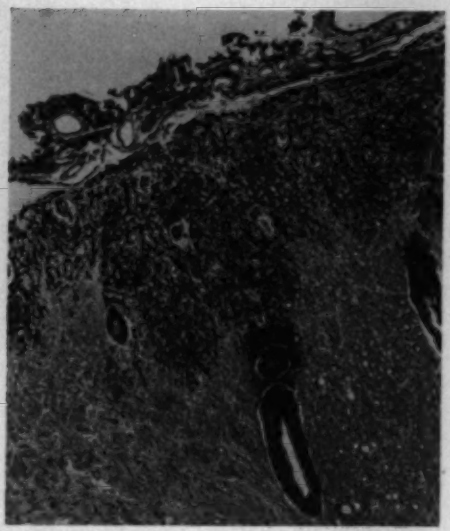

Fig. 8 (Egleston, McPherson, and Perry). Perivascular infiltration of tumor cells and invasion of cortex from meninges (×120).

small white nodules of tumor measuring up to four mm. in diameter. Bilateral incomplete Wallerian degeneration of the optic tracts was due to the replacement of the right optic nerve by the tumor (fig. 6). The meningeal infiltrate extended down about the cerebellum, the brain stem, and the upper cervical cord (fig. 7). A striking perivascular infiltration of tumor cells with invasion of the adjacent tissues and direct extension by the tumor into tissues underlying the meninges occurred throughout the central nervous system (fig. 8).

The right eye had been removed previously but nests of invading tumor cells were present in the soft tissues of the right orbital space. No other extracranial foci of the tumor were found. The origin of the tumor in the eye, its cellular pattern, and its mode of extension and growth in the nervous system are characteristic of a retinoblastoma.


## Summary

A case of retinoblastoma with intracranial extension is presented in which the diagnosis was masked by the history of trauma and the presence of intraocular hemorrhage.


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# EYE MOVEMENTS ASSOCIATED WITH MYOCLONUS*


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Myoclonus of the palate, eyes, and other structures has been discussed in neurology literature for many years. Ophthalmologists may rarely encounter such a case but should be aware of the syndrome with its ocular manifestations.

Myoclonus denotes rhythmic muscular contractions at a rate of 50 to 180 per minute. The palate is most frequently involved. Other structures such as the eyes, facial muscles, pharynx, tongue, larynx, diaphragm, mouth of the eustachian tube, extremities, neck, and trunk may synchronously manifest the myoclonus. The movements may be unilateral but are usually bilateral.

Guillain[1] in a classical discussion in 1938 indicated that the syndrome was reported by Politzer in 1862, Schwartz in 1865, and Boeck in 1866, but that Spencer emphasized its importance to neurologists in 1886.

Guillain stressed that there is a distinction

* From the Wilmer Ophthalmological Institute of The Johns Hopkins Hospital. Presented in part before the Wilmer Residents Association, March 28, 1958.

between ocular myoclonus and the jerks of ordinary nystagmus. The myoclonic movements he described were oscillatory, equal in excursion, rhythmic, and synchronous with contractions of other structures. He noted a common association with crossed hemiplegia, paralysis of lateral movement of the eyes, cerebellar signs, giddiness, true nystagmus, and hemianesthesia. Patients may complain of a clicking sound in the ear which may be audible to the examiner. Oscillopsia and vertigo may also be described.

Although myoclonus has been observed in adolescence, it is more commonly seen after 50 years of age. It has been reported most frequently to be of vascular origin including arteriosclerosis, hypertensive disease, syphilis, and vertebral arterial aneurysm. Myoclonus has resulted also from encephalitis, disseminated sclerosis, encephalomyelitis, trauma to the cerebellum, tumor involving the brain stem or cerebellum, and heredofamilial tremor.[1,2]

The pathologic physiology has been studied on the basis of autopsy material. Myoclonus may result from lesions in or near the olivodentate pathways with involvement of the homolateral dentate nucleus, contralateral red nucleus, contralateral inferior olive, and central tegmental tract[2] (fig. 1). Gullain[1] cited the work of van Bogaert and Bertrand (1928) as emphasizing the importance of the olivodentate system. On the basis of his own studies Gullain stressed that the inferior olivary nuclei were nervous structures of great importance and that in myoclonus the inferior olive was usually primarily or secondarily involved. Lesions involving the opposite cerebellar hemisphere, especially the dentate nucleus, may cause retrograde changes in the inferior olive. Nathanson[3] in 1956 reported such secondary changes from cerebellar tumor.

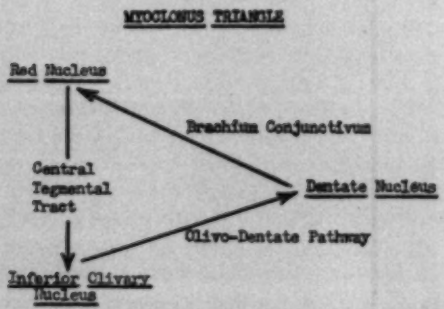


Fig. 1 (Cooper). Diagram of structures which may become involved to cause myoclonus.

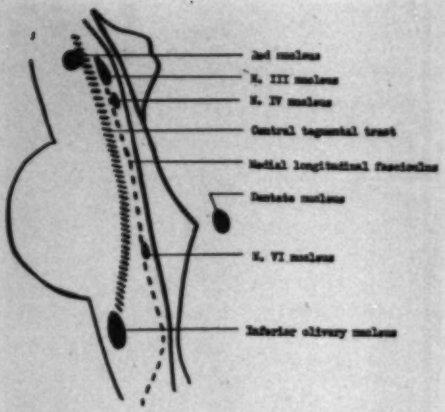


Fig. 2 (Cooper). Sagittal section of brain stem shows relative position of the central tegmental tract, medial longitudinal fasciculus, and important nuclei.

Weingarten,[4] in 1954, emphasized that the central tegmental tract assumes a most important role in the extrapyramidal system. The tract receives from the thalamus and red nucleus fibers which terminate in the inferior olivary nucleus. It is related to the vestibular apparatus and oculomotor function via communication with the medial longitudinal fasciculus. The brachium conjunctivum from the dentate nucleus crosses near the tract to enter the red nucleus (figs. 2 and 3). Weingarten suggested that lesions involving the central tegmental tract at a lower level near the olive contribute to myoclonus of the pharynx and palate, whereas at a higher level near the red nucleus lesions result in spontaneous involuntary movements and alteration in conjugate gaze.

Bender, Nathanson, and Gordon[5] in 1952,

Fig. 3 (Cooper). Hemorrhage involves bilaterally the central tegmental tract, medial longitudinal fasciculus, and medial lemniscus (Lindenberg).

emphasized the striking pseudohypertrophy or swelling of the inferior olive with swelling of the nerve cells, thickening of their processes, displacement of the nuclei, and vacuolization. Neuroglial formation was increased in and about the olive.

Weinstein and Bender[6] in 1943 electrically stimulated a monkey's brain stem. Stimulation of the reticular substance and inferior olive produced palato-glosso-facial myoclonus. Stimulation of the central tegmental fasciculus produced simultaneous nonrhythmic contractions of the face, eyelids, and eyes.

Luttrell and Bang[7] experimentally found that Newcastle disease virus encephalitis caused myoclonus of the head, neck, trunk, and extremities in cats. Bender et al. showed that intravenous sodium amytal or tolserol had no tendency to abolish myoclonic movements of the palate, face, larynx, and diaphragm. Only the rhythmic ocular and lid movements were abolished. Coarse nystagmus persisted when the eyes were turned in any direction.

Nathanson[3] discussed the persistence of myoclonus despite inhalation of five percent $CO_2$ and 100-percent $O_2$, intravenous barbiturates, natural sleep, caloric stimulation, carotid sinus pressure, phonation, breath holding, coma, and impending death. Tracings were made by Bender et al. of simultaneous electrical recording from the eye, face, larynx, and pulse. They indicated that the rhythmic movements were not directly related to pulse and respiration.

A review of 30 case reports of the myoclonus syndrome from a variety of authors[2, 3, 5, 8, 9] revealed that nystagmus was present in 15 cases. The eye movements were synchronous with palatal and associated muscular contractions in four cases. One other case had lid movements which were synchronous with contractions of the palate.

Herrmann, Crondall, and Fang[2] included a case with horizontal, rotary, and vertical eye movements in which only the vertical movements were synchronous with palatal myoclonus of 140 per minute. Another of their cases had continuous rotary and vertical oscillation of the left eye which was synchronous with left-sided palatal myoclonus of 130 per minute.

Bender et al. described a patient with rotary, rhythmic ocular movements which were synchronous with palatal movements of 130 per minute. The excursions of the right eye exceeded those in the left eye. The movement of the eyes varied with gaze, appeared least in the primary position, and were continuous with the eyes closed.

McCarthy[8] presented a case which for two or three years had been thought to have ordinary nystagmus. When the palatal myoclonus was discovered, it became apparent that the rotary eye movements were rhythmic, sustained, and synchronous with the palatal movements of 100 per minute. The amplitude in the left eye was three mm. and in the right eye was somewhat less.

An additional seven case records of patients with palatal myoclonus were obtained from the Neurology Department of The Johns Hopkins and Baltimore City Hospitals. Four of the seven patients had manifestations of interest to ophthalmologists, and these four cases will be discussed.

## Case reports

### Case 1

J. S. (J.H.H. #737686), a 55-year-old Negro, in April, 1956, was found at The Johns Hopkins Hos-

pital to have hypertensive arteriosclerotic heart disease. In May, 1956, he had right-sided headaches for two days. He fell to the floor with left-sided weakness, difficulty in speech, and diplopia.

On admission to the hospital he had a partial left third nerve paralysis. The right eye failed to adduct or abduct well. The left pupil was larger than the right and he had a left ptosis. There was left hemiparesis, bilateral cerebellar inco-ordination of the extremities, and cerebellar speech.

Examination three weeks later revealed full eye movements and equal pupils. He had vertical and horizontal nystagmus which was accentuated on left lateral gaze. His gait was ataxic. Oscillatory voluntary movements were noted in the right wrist and elbow. Blood serology was positive but the spinal fluid serology was negative. Appropriate treatment for syphilis was given. It was thought that he had bilateral signs and more than one lesion. The diagnosis was myocardial infarction and emboli to the upper brain stem.

In August, 1957, in the Neurology Clinic a tremor of the right arm was attributed to a lesion in the region of the red nucleus. In September, 1957, the patient described a twitching sensation in his throat. He was re-admitted to the hospital in October, 1957, with substernal pain. He had no diplopia, although he described some dizziness and vertigo. He was aware of no clicking sensation in his head.

Examination revealed a blood pressure 164/110 mm. Hg, a regular pulse of 80, and respiration of 16 per minute. His mental status was lucid. Speech was very explosive. There was a fine horizontal nystagmus on left lateral gaze and an intermittent vertical nystagmus on upward gaze. Mild facial asymmetry was suggestive of a left central facial weakness. There were rhythmical synchronous movements of the soft palate, pharynx, larynx, floor of the mouth, lower part of the face, upper eyelids, the diaphragm at a rate of 150 per minute. The rhythmic oscillations of the right arm had the rate of 190 per minute. Otherwise, motor and sensory findings were unchanged.

Analyses of the blood, urine, and electrocardiogram added little information. The impression was: (1) Upper brain stem lesions secondary to arteriosclerosis in the basilar artery and its paramedian perforating branches; (2) red nucleus tremor of the upper extremity; and (3) a palato-facio-laryngo-diaphragmatic myoclonus.

On October 26, 1957, an ophthalmologic examination was performed. Both palpebral fissures measured 10 mm. There was a fine tremor of the upper and lower eyelids which became greatly accentuated upon voluntary closure. The rate was 150 per minute. The eyes were straight in the primary position. Ductions and versions were full, and he converged nearly to the tip of his nose.

In the primary position the eyes appeared steady. On upward gaze there was an inconstant fine vertical movement which had no quick component. In all cardinal positions the eyes had an inconstant, nonrhythmic, horizontal, pendular movement which at times appeared slightly rotary. An occasional quick component in the direction of lateral gaze was more apparent when he looked to the left.

There was noted during ophthalmoscopy a rhythmic, pendular motion of the eyes at a rate of 150 per minute. This occurred in all directions of gaze and with the lids separated from the globe. The fundi had normal discs, maculas, moderate arteriolarsclerosis, and a few fluffy exudates without hemorrhages. The pupils were three mm. in size and constricted well to light and on convergence. Vision in both eyes was correctible to 20/15 and J1. Visual fields were peripherally full to 3/330 white and centrally full to 3/1,000 white and 6/1,000 red and blue. Slitlamp examination and tonometry were normal.

*Comment.* This hypertensive arteriosclerotic patient represents a case of myoclonus with involvement of the eyes, eyelids, lower face, palate, pharynx, floor of the mouth, larynx, and diaphragm. He had a transient left third-nerve paralysis, defective conjugate gaze, tremor of the right arm, bilateral cerebellar inco-ordination of the extremities, and mild left hemiparesis. In addition to the ocular myoclonus, there was an inconstant, nonrhythmical, horizontal, vertical, and rotary nystagmus of the eyes. He had been aware of diplopia, vertigo, and a twitching in his throat. This patient presumably suffered from vascular insufficiency in the brain stem involving the tegmental tract at a high and low level.

CASE 2

M. G. (B.C.H. #155514), a hypertensive arteriosclerotic 60-year-old man, had bilateral upper motor neurone signs, slurred speech, clicking in his ears, myoclonus of the palate, tongue, jaw, and eyelids. Later were described fine rhythmical movements of the eyes which made examination of the fundi difficult. Left lateral gaze was inadequate. All movements were synchronous and disappeared during sleep. The patient lived for three years and died in 1955. The diagnosis was terminal bronchopneumonia and hypertensive arteriosclerotic disease involving the upper and lower brain stem.

*Comment.* It is noteworthy that the myoclonus disappeared during sleep, which is contrary to previous reports.

CASE 3

E. T. (B.C.H. #227246) was a 49-year-old woman. She had primary myxedema, chronic al-

coholism, Laennec's cirrhosis, hemolytic anemia, thrombotic thrombocytopenic purpura, and arteriosclerosis. Following sudden onset of left hemiplegia and right hemiparesis she developed myoclonus. The rate was 60 per minute. The movements involved the left half of the body including the face, palate, tongue, neck, larynx, diaphragm, thorax, abdomen, and arm. The eyes were described as being deviated to the left, where a fine horizontal and vertical nystagmus was apparent. Conjugate movements of the eyes were synchronized often with myoclonus elsewhere. The myoclonus was considered to be a result of arteriosclerosis, thrombotic thrombocytopenia, or hemorrhage in the brain stem. She died seven weeks later with bronchopneumonia.

*Comment.* Vascular thrombosis from abnormal platelets and hemorrhagic disease have not previously been entertained in the differential diagnosis of the myoclonus syndrome.

CASE 4

G. B. (J.H.H. #601876) was a 69-year-old man with hypertension. He complained in 1952 of dizziness and a "nervous hand." Examination revealed myoclonus of the right wrist and fingers, palate, and circumoral muscles at a rate of 180 per minute. Myoclonus of the tongue and closed eyelids was noted two years later. The patient's speech was hesitant and gait was hemiparetic. There was no record of eye movements. He died in 1955 from atelectasis and a cerebrovascular accident following a suprapubic prostatectomy.

## CONCLUSIONS

Myoclonus results from a variety of lesions which involve the inferior olivary nucleus, dentate nucleus, red nucleus, and the pathways by which these structures are related, in particular, the central tegmental tract. The palate is most often affected. Movements of the eyes, facial muscles, pharynx, tongue, larynx, diaphragm, mouth of the eustachian tube, neck, trunk, and extremities may be synchronously associated. Yakovlev in discussing the paper by Luttrell and Bang[7] suggested that the rhythmic myoclonus in musculature of branchial derivation and in somatic musculature represents a release phenomenon. Primitive rhythmic viscerosomatic respiratory synergies of the bulbo-reticular formation presumably emerge from control of cortical, subcortical, and suprabulbar centers. Brain stem signs and symptoms are often associated with myoclonus. According to Guillain, the frequent occurrence of paralysis in brain stem lesions may prevent myoclonus from being a more common syndrome.

An analysis of eye movements in 37 cases with the myoclonus syndrome revealed that 17 patients had nystagmus, six had true ocular myoclonus. The nystagmus was horizontal, vertical, or rotary, and often was mixed. The ocular myoclonus was described variously as vertical, rotary, horizontal, or pendular oscillations which were synchronous with movements of other structures. In two of the four cases reported herein the ocular myoclonus was noticed upon ophthalmoscopy.

In the evaluation of pendular or jerky eye movements one should examine for palatal or associated myoclonus, for this association has been found to result from lesions involving specific structures in the brain stem and cerebellum. The lesions may be neoplastic, vascular, inflammatory, demyelinizing, hematologic, or traumatic.

*The Johns Hopkins Hospital (5).*

ACKNOWLEDGMENT

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## PHLYCTENULAR KERATOCONJUNCTIVITIS*

### Among Canadian Eskimos and Indians

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In 1951, Thygeson and his associates published a series of articles[1-3] on phlyctenular keratoconjunctivitis or phlyctenulosis in Alaskan natives. This study encouraged us to carry out a somewhat parallel review of the disease as it affects the Indians and Eskimos of Alberta, the Northwest Territories, and the Yukon. The presence of the Charles Camsell Indian Hospital in Edmonton offered unique opportunity to study an appreciable number of natives representing inhabitants of the vast area stretching from British Columbia on the west to Saskatchewan on the east and from the United States boundary on the south to the Arctic Ocean on the north (fig. 1).

Fig. 1 (Duggan and Hatfield). Area served by the Charles Camsell Indian Hospital.

The majority of patients examined had been admitted to the hospital for other than ocular disease—chiefly pulmonary tuberculosis. The entire population of the hospital was examined over a four-month period to determine the incidence of present and past phlyctenulosis and its effect, if any, upon visual acuity.

Table 1 shows a comparison of the incidence of the disease, active and inactive, in

* From the Department of Ophthalmology, Faculty of Medicine, University of Alberta.

TABLE 1

Comparative Incidence of Phlyctenulosis: Active and Inactive in Alaskan and Canadian Natives

| | School Children | Children in Orthopedic Hospital | Patients in Tuberculosis Sanatorium | Charles Camsell Indian Hospital |
|---|---|---|---|---|
| | Alaska | Alaska | Alaska | Canada |
| Active phlyctenulosis | 10 | 1 | 2 | 8 |
| Inactive phlyctenulosis | 133 | 29 | 55 | 153 |
| No evidence of past or present phlyctenulosis | 261 | 36 | 109 | 774 |
| Total number of cases | 404 | 66 | 146 | 935 |
| Phlyctenulosis index | 35.4% | 45.4% | 25.3% | 17.2% |

TABLE 2

COMPARATIVE SEX INCIDENCE OF ACTIVE PHLYCTENULOSIS IN ALASKAN AND CANADIAN NATIVES

| | Total Number of Cases | Males | Females |
|---|---|---|---|
| Alaska | 10 | 2 | 8 |
| Canada | 8 | 4 | 4 |

TABLE 3

COMPARATIVE INCIDENCE OF BLEPHARITIS IN ACTIVE CASES OF PHLYCTENULOSIS IN ALASKAN AND CANADIAN NATIVES

| | Total Number of Cases | Number of Cases with Blepharitis | Cases with Blepharitis |
|---|---|---|---|
| Alaska | 10 | 4 | 40% |
| Canada | 8 | 4 | 50% |

Alaskan and Canadian natives. The Canadian incidence is somewhat lower than that reported by Dr. Thygeson—this may be due to the higher ratio of adults to children in the Canadian group.

Table 2 shows a comparison of the sex incidence in the active cases in Alaska (Mt. Edgecumbe) and Canada. Table 3 shows a comparison of the incidence of marginal blepharitis in the active cases in Alaska (Mt. Edgecumbe) and Canada. Table 4 shows the importance of phlytenulosis as related to visual acuity in Alaskan natives (adapted from Dr. Thygeson's figures).

Table 5 similarly shows the importance of phlyctenulosis as related to visual acuity in Canadian natives. Table 6 shows a com-

TABLE 4

VISUAL ACUITY IN RELATION TO PHLYCTENULOSIS IN ALASKAN NATIVES

| | 20/70 or Less | | Above 20/70 | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| Group I<br>Visual acuity (uncorrected) of 200 individual eyes of Indian and Eskimo children without evidence of past or present phlyctenulosis | 25 | 12.5 | 175 | 87.5 |
| Group II<br>Visual acuity (uncorrected) of 200 individual eyes of Indian and Eskimo children with active and inactive phlyctenulosis | 69 | 34.5 | 131 | 65.5 |
| Group III<br>Visual acuity (uncorrected) of 101 individual eyes of Indian and Eskimo children with phlyctenulosis scars involving pupillary area | 54 | 53.5 | 47 | 46.5 |

TABLE 5

VISUAL ACUITY IN RELATION TO PHLYCTENULOSIS IN CANADIAN NATIVES

| | 20/70 or Less | | Above 20/70 | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| Group I<br>Visual acuity (uncorrected) of 583 individual eyes of Indians and Eskimos without evidence of past or present phlyctenulosis | 81 | 14 | 502 | 86 |
| Group II<br>Visual acuity (uncorrected) of 114 individual eyes of Indians and Eskimos with active and inactive phlyctenulosis | 34 | 30 | 80 | 70 |
| Group III<br>Visual acuity (uncorrected) of 47 individual eyes of Indians and Eskimos with phlyctenulosis scars involving the pupillary zone | 24 | 51 | 23 | 49 |

TABLE 6

COMPARISON OF EFFECT OF PHLYCTENULOSIS ON VISUAL ACUITY IN ALASKAN AND CANADIAN NATIVES

| | Group I | | Group II | | Group III | |
|---|---|---|---|---|---|---|
| | 20/70 or Less | Above 20/70 | 20/70 or Less | Above 20/70 | 20/70 or Less | Above 20/70 |
| Alaskan natives | 12.5 | 87.5 | 34.5 | 65.5 | 53.5 | 46.5 |
| Canadian natives | 14 | 86 | 30 | 70 | 52 | 48 |

parison of the Alaskan and Canadian statistics as applied to Group I—without evidence of past or present phlyctenulosis; Group II —with active and inactive phlyctenulosis; and Group III—with phlyctenulosis scars involving the pupillary area.

## SUMMARY AND CONCLUSION:

1. A group of 467 patients were examined in the Charles Camsell Indian Hospital, Edmonton, Alberta. Ocular findings on 935 individual eyes are recorded.

2. Evidence of past or present phlyctenulosis was noted in 161 eyes—an incidence of 17.2 percent.

3. The effect of the disease on uncorrected visual acuity is recorded.

4. Canadian statistics are compared to those compiled by Dr. Thygeson and his associates on Alaskan natives—compared as to over-all incidence, as to sex incidence, and incidence of blepharitis in active cases and as to effect upon visual acuity. Except for a somewhat lower phlyctenulosis index among Canadian natives, Alaskan and Canadian statistics show remarkable similarity especially when considering the effect of the disease upon visual acuity.

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# TEMPORARY ARTIFICIAL PARESIS OF THE EXTERNAL EYE MUSCLES*

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The present report deals with the therapeutic possibilities of a temporary artificial paresis of the external eye muscles, using the drug Rhaetocain.

Rhaetocain (Alpine Chemische A.G.—Kufstein) is a complex compound of para-aminobenzoic-acid-ethyl-ester and a pyrazolone body. On dilution with water or through the action of the tissue fluid the anesthetic component (para-amino . . .) is precipitated in the form of tiny suspended crystals and deposited in the area of application, where it remains until it is finally resorbed. As I was able to prove by my own experiments,[1,2] the protracted effect is not due to a prolonged anesthesia but rather to a chemotoxic injury to the injected tissue. In experiments on animals, histologic examination showed, in the first place, degenerative changes in the muscle fibers[1] and, secondly, injuries to the myelin sheath of the peripheral nerves corresponding to the changes occurring in a toxic neuritis.[2] These changes, however, were not permanent and, after some time, had disappeared completely with histologic findings back to normal.

Rhaetocain is directly instilled into the eye muscle under treatment. This medication is available in 1.5-percent, 3.0-percent, and 6.0-percent solution. For most purposes a 3.0-percent solution will be satisfactory. By appropriate injection a temporary artificial paralysis can be induced in the following extrinsic eye muscles: (1) the rectus muscles, (2) the orbicularis oculi, and (3) the superior levator palpebrarum.

## I. Rectus muscles

Rhaetocain is injected into the muscle belly of the lateral rectus.[3] Following repeated instillation of 5.0- and 10 percent cocaine and adrenalin of 1 : 1,000 into the conjunctival sac, a lid spreader is inserted and the patient is instructed to gaze in the direction directly opposite to the action of the muscle to be infiltrated. Following this, the muscle under treatment is grasped near its insertion with a surgical forceps in a manner similar to the placing of a traction suture in a cataract operation. The muscle is then lifted and pierced bilaterally and longitudinally with a thin short needle; it is then injected from both sides along a length of six to eight mm. Subsequently the eye is kept bandaged for one day.

One-half to 0.8 cc. of a 3.0-percent Rhaetocain solution is sufficient. A 6.0-percent Rhaetocain solution will produce a considerable swelling of the lids and a chemosis of the bulbar conjunctiva, reflecting a toxic reaction to an excessively high concentration. In isolated cases a 3.0-percent Rhaetocain solution may even produce a slightly increased swelling and, occasionally, a somewhat increased subconjunctival ecchymosis, reflecting a parenchymal hemorrhage of the needled muscle. However, administration of adrenalin is impossible, since it would immediately produce a precipitation of the para-amino.

Immediately following the injection one may clearly observe a restriction of motility in the direction of the injected muscle; this reaches its maximum the day after the injection and does not return to normal until seven to 10 days later.

Rhaetocain can be injected into the lateral rectus as well as into the medial rectus. Restriction of motility is less pronounced following injection of the medial rectus than after injection of the lateral rectus. This may be due to the greater difficulty of injecting the muscle belly of the medial rectus

* From the 1st University Eye Clinic. Chief: Prof. Dr. A. Pillat.

to exactly the same extent because a much smaller portion is exposed by elevating with a forceps than in the case of the lateral rectus.

Injection of Rhaetocain in the superior rectus muscle should be strictly avoided, since diffusion of the anesthetic would involve the directly overlying levator palpebrum superioris, thereby leading to complete ptosis of the upper lid which may last as long as eight weeks.

Injection of the inferior rectus muscle was made only occasionally; however, it was well tolerated.

The therapeutic application of Rhaetocain injections in the rectus muscles is indicated only as a postoperative measure to improve a residual squint angle. The application of the agent in nonoperative cases of strabismus will produce only a temporary change in the angle of squint and is, therefore, of no therapeutic value.

### 1. Management of overcorrection following squint surgery

The danger of surgical overcorrection is especially great in those cases of esotropia where at the same operation the lateral rectus is advanced after tenotomy of the medial rectus. Although in many cases appropriate postoperative orthoptic treatment can lead to minor corrections of the angle of squint, the prognosis for orthoptic exercise is poor, especially in overcorrected amblyopic eyes. In many cases this postoperative overcorrection tends to become progressively more pronounced, thus necessitating another squint operation.

If Rhaetocain is injected in the muscle four to 10 days after it has been advanced, the injected muscle is markedly weakened. The favorable effect seems to be due to the fact that the injection is made at a time when the equilibrium between the action of the medial rectus and the lateral rectus has not yet been stabilized. The antagonist is thus enabled to prevent overcorrection by a relative increase in its muscular force.

It seems advisable to remove the advancement sutures before injecting the muscle, since the effect of the injection is greater if the muscle is not constricted by sutures. Removal of the sutures alone, if done two or three days after the operation, will have no decisive effect on the overcorrection once it has occurred.[4]

The following case illustrates the mode of action of Rhaetocain injections.

A 15-year-old patient (K. G. 738/54) squinted since the age of one year. The patient had a right monocular esotropia. Visual acuity was: R.E., 2/60; L.E., 6/6. Refractive error: R.E., +3.0D. sph. ⌒ +5.0D. cyl. ax. 95°; L.E., +1.0D. cyl. ax. 90°. Angle of squint: 40 degrees. Treatment: Tenotomy of the right medial rectus and advancement of the right lateral rectus. Two days after the operation the patient was noted to be exotropic (5 degrees); 4 days after operation, 10 degrees; and five days 15 degrees exotropic.

At this stage Rhaetocain was injected in the lateral rectus muscle. On the sixth postoperative day the exotropia had diminished to two degrees, and on the 10th day the patient was three degrees esotropic. When examined six months after the operation the patient was still found to be three degrees esotropic. Figure 1 shows the clinical course of this patient.

### 2. Supportive treatment after squint operation

A further possibility offered by the injection of Rhaetocain in the postoperative treatment of a squint case is the injection of the antagonist of the operated muscle. The resulting relaxation of the antagonist reduces

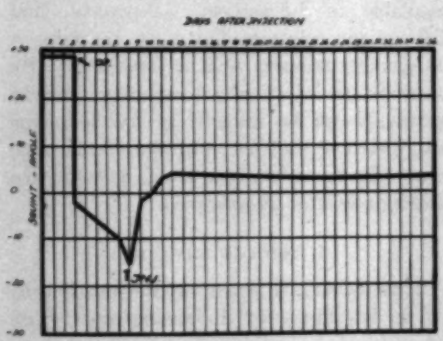

Fig. 1 (Schenk). The clinical course in a case of overcorrection following squint surgery.

the continuous traction against the operated muscle, thus helping to keep the operated muscle in position and facilitating its healing to the globe. The best indication for injection of Rhaetocain is in cases where a weak or atrophic muscle has been advanced.

## II. Orbicularis oculi

### 1. Long-acting akinesia

If Rhaetocain is used instead of a local anesthetic to induce akinesia, it produces a considerably longer lasting paralysis of the orbicularis muscle of the lid.[5] The akinesia can be produced either by direct infiltration of the muscle (method of van Lint-Rochat[6]), or by blocking the facial nerve at a point near the anterior margin of the parotid plexus (method of O'Brien[7]).

It should be noted, however, that while a Rhaetocain akinesia produced by the O'Brien method leads to no unfavorable reaction in the injected area, injection by the van Lint method often produces a disturbing swelling. For this reason the O'Brien method was applied exclusively. Two cc. of a 3.0- or 1.5-percent solution were used for injection.

The Rhaetocain akinesia produced by the O'Brien method reaches its maximum a few minutes after the injection but lid power remains reduced for a considerably longer period than is the case with akinesia produced by a local anesthetic of the usual type. With a 1.5-percent solution, lid power is back to normal after 10 to 30 days, and after 60 to 120 days with a 3.0-percent solution. However, the akinesia produced by injecting Rhaetocain is not so complete as an akinesia obtained with 4.0-percent Novocain. Within two hours after the injection, the patient is able to close the lids, although muscular strength is considerably reduced. The exact course of the akinesia can be followed by means of the "lid power meter" described by Mueller.[3]

The strength of the orbicularis oculi muscle returns to approximately half the normal value after three to six days with a 1.5-percent solution, and after five to 15 days with a 3.0-percent solution. Restriction of lid power after this stage eludes detection by the usual methods of clinical examination and can be demonstrated only when measured with the Mueller apparatus. The patient will hardly be disturbed by the remaining slight diminution of lid power. Figure 2 shows the course of treatment with 1.5- and 3.0-percent Rhaetocain akinesia produced by the O'Brien method. The two curves show average values of 10 patients in each group.

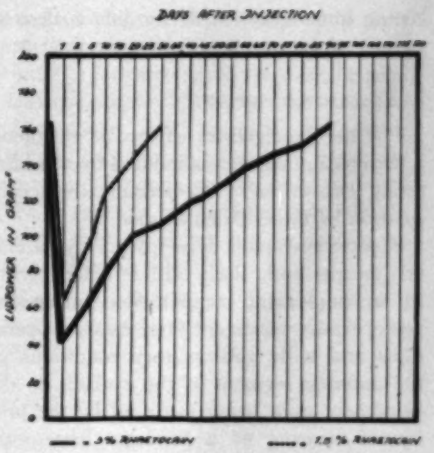


Fig. 2 (Schenk). Demonstrating the course of treatment with 1.5- and 3.0-percent Rhaetocain akinesia produced by the O'Brien method.

The application of a long-acting Rhaetocain akinesia is particularly advisable in the restless or unreasonable type of patient (the squeezers). In the majority of cases a 1.5-percent solution, which may be administered the day prior to the operation, will be satisfactory. If sufficient reduction of lid power does not occur, a local anesthetic can be administered immediately before the operation to induce additional akinesia. In any case, the O'Brien method is preferable, since it avoids a disturbing swelling in the operative area. Apart from its indication in cataract operations, it can be used in keratoplasty and detachment surgery where a long-

lasting immobilization of the lids is desired as part of the complete rest of the patient.

### 2. Spastic entropion

For the management of spastic entropion a Rhaetocain akinesia is induced by administering two cc. of a 3.0-percent Rhaetocain solution by the O'Brien method.

Spastic entropion develops mainly in elderly people with slack lids. It often occurs as an unpleasant complication during the postoperative treatment after cataract operations and with inflammatory conditions of the anterior segment of the eyeball, its development even being nurtured by the prolonged wearing of a bandage. Rhaetocain akinesia is advisable in those cases in which it is absolutely necessary to keep the eye under bandage for some prolonged period of time.

### 3. Blepharospasm

In essential blepharospasm a long-lasting reduction of lid power is desirable. In these cases akinesia is induced by injecting a 3.0-percent or 6.0-percent Rhaetocain solution. The effect of highly concentrated Rhaetocain injections is similar to that of 70 to 80-percent alcohol.[9-11] The main advantage of Rhaetocain over alcohol is that Rhaetocain can be applied without causing any pain; it also produces considerably less reaction in the neighboring tissues.[12]

## III. Superior levator palpebrarum

It was observed that, as a side effect of the injection of the superior rectus muscle, there occurred a temporary ptosis of the upper lid due to the diffusion of Rhaetocain to the overlying levator muscle. Rhaetocain was therefore injected directly into the levator. By this intramuscular application of Rhaetocain it was possible to produce an artificial ptosis of the lid.[13] Using a long thin needle, the upper lid was pierced laterally and medially and the levator infiltrated. From 0.4 to 0.5 cc. of 3.0-percent Rhaetocain was injected in each side of the muscle. The needle was introduced at the upper edge of the tarsus at the junctions between the nasal and middle and the middle and lateral thirds of the lid. It was inserted a depth of approximately 12 to 15 mm. The eye was kept bandaged for 24 hours.

Within a few seconds after the injection there is complete ptosis of the upper lid which lasts for four to six weeks as a total ptosis and disappears completely only after eight to 12 weeks. This treatment can be applied instead of a moist chamber in cases of lagophthalmos or lagophthalmic keratitis and is particularly advisable in those cases in which the application of a moist chamber is difficult. It is quite common that patients with a fracture of the skull base who are unconscious for several days remove the bandage in their motor restlessness. The application of a moist chamber is often impossible in cases of severe injuries or operations in the facial region. Finally, unreasonable patients fail to realize the necessity of the bandage and remove the moist chamber even though the lagophthalmic eye is in need of protection. The paralyzed lid provides a temporary complete cover for the cornea.

In more than 200 injections made over a three-year period of observation, no permanent injurious effect of Rhaetocain was observed in any of the cases under treatment. In isolated cases repeated administration led to hypersensitivity to the drug, shown by an increased swelling of the injected area, and use of the agent had to be discontinued.

An unpleasant side-effect observed in a number of cases was a subconjunctival hemorrhage following the injection of the lateral rectus. For a similar reason Rhaetocain is not recommended for retrobulbar injection. In preliminary experiments carried out on blind eyes to be enucleated, retrobulbar injection of Rhaetocain produced a retrobulbar hemorrhage in some cases. Such hemorrhagic complications were not observed with akinesia produced by the O'Brien method or following infiltration of the levator palpebrae.

## Summary

The report deals with the therapeutic possibilities of a temporary artificial paresis of the extrinsic eye muscles. Intramuscular injection of Rhaetocain leads to a temporary chemotoxic injury to the injected muscle. Injection of the rectus muscles can be used both to prevent overcorrection following squint surgery and to produce a supportive effect during the course of the operation. A long-lasting akinesia can be produced in the restless and unco-operative patient prior to more complicated intraocular intervention. Furthermore, a long-acting akinesia can be used to manage spastic entropion and essential blepharospasm. Infiltration of the levator palpebrae produces a temporary ptosis of the upper lid which protects the exposed cornea in cases of lagophthalmos or lagophthalmic keratitis and can thus be used to replace a moist chamber.


*Alser Strasse 4 (IX).*

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## Ophthalmic Miniature

A peculiar warty-looking growth, causing ptosis, was removed by Mr. Bowman from the upper cul-de-sac of the conjunctiva. A pendulous growth, in the same situation, was removed; it consisted of organized fibrin, etc., and was modelled into its shape by the movements of the lid; it was caused by a husk, which on everting the lid, was found embedded in the conjunctiva, where it had been for two months.

Ophth. Hosp. Reports, 1:35, 1857.

# NOTES CASES INSTRUMENTS

## PORTABLE REFRACTOR UNIT*

G. PETER HALBERG, M.D.
*New York*

Many ophthalmologists still have the old De Zeng type refractor in their offices. I found that the refractor cells of this instrument fit the palm of the hand comfortably (glove size 7½) and practically without any further transformation (except a rather delicate dismantling and cleaning job) a single refractor cell can be used as a quite flexible aid for retinoscopy, providing a fairly complete battery of lenses.

Each refractor cell contains four independent lens-discs. Disc 1 contains the following lenses: +0.25, +0.50, +0.75, +1.00, +1.25, +1.50, +1.75. Disc 2 contains a −0.25, −0.50, −0.75, −1.00, −1.25, −1.50, −1.75. Disc 3 contains a +2.00, +4.00, +6.00, −2.00, −4.00, −6.00, −8.00.

The examiner easily manipulates Discs 1, 2, and 3 by the index finger or thumb. Direct reading of the lens values is quite satisfactory.

A fourth auxiliary disc contains the following lenses: +8.00, −10.00, +0.12, −0.12, and a +1.50 lens for retinoscopy at 66 cm.

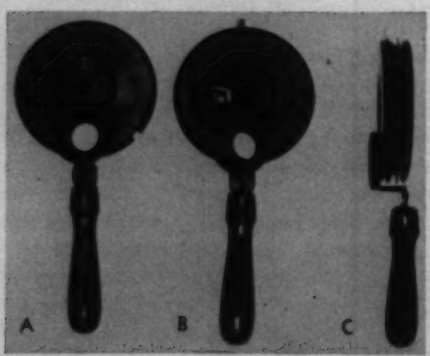


Fig. 1 (Halberg). (A) Patient's side. (B) Examiner's side. (C) Side view of instrument.

Fig. 2 (Halberg). Instrument in use.

All lenses are spheres of good optical quality. They can be used individually or in combinations.

Recently a wooden tool handle, painted with black lacquer, was added. The total weight of the instrument is less than one pound (10¾ ounces). It is a handy unit to have in the medical bag for clinic or bedside use.

In the office, in addition to its use for retinoscopy, it is helpful in the selection of strong reading additions for low visual acuity cases.

*936 Fifth Avenue (21).*

ACKNOWLEDGMENT

The technical assistance of Mr. Frank Fencl, Old Brookville, New York, is gratefully acknowledged.

* Aided by a grant from the Ophthalmological Foundation, Inc.

## VISUAL ACUITY AND COLOR RECOGNITION TEST FOR CHILDREN*

CONRAD BERENS, M.D.
*New York*

Although it is exceedingly important to determine the visual acuity of small children under four years of age, to obtain even an approximation of visual acuity is often practically impossible. After having used the test to be described for several years, it seems to be about as practical as any method I have used for obtaining approximation of visual acuity in young children.

The apparatus consists of an open box, neutral gray in color, which contains 20 red, green, blue, and white enameled spheres of various sizes.† These test objects are 15 mm., 10 mm., 5.0 mm., and 3.0 mm. in diameter which, at the distance that the test normally is used (conveniently 25 cm.), subtends an *approximate* visual angle of 3° 14′ for the 15-mm. ball; 2° 6′ for the 10-mm. ball; 1° 5′ for the 5.0-mm. ball and 0° 39′ for the 3.0-mm. ball.

The colored spheres have the following specifications‡ according to Hardy's measurements on the brightness of the four 10-mm. objects indicated their reflection factors as:

| | |
|---|---|
| White | 0.877, or 87.7% |
| Green | 0.388, or 38.8% |
| Red | 0.345, or 34.5% |
| Blue | 0.065 to 0.07, or 6.5% to 7% |

The results of measurements on fresh Heidelberg papers§ showed the following:

| | |
|---|---|
| Red | 0.09, or 9% |
| Blue | 0.04 to 0.09, or 4% to 9% |
| Green | 0.38, or 38% |

The high reflection factor for the red test object is due to a disproportionate mixture of white enamel and can be adjusted downward by decreasing this ingredient, if desired.

The color extends entirely through the spheres so that if they should be chipped this would make no serious difference. Washing the test objects does not change their quality, nor is this affected by exposure to ultraviolet rays for 30 minutes.

Used as a visual acuity test, one or more of the spheres is left in the box which is brought to within 25 cm. of the child's eyes to be tested. The box is moved, activating the ball to attract the child's attention and to stimulate him to reach for the object and attempt to remove it. The smallest ball which the child apparently sees or preferably can pick up, indicates the visual acuity for both eyes at 25 cm. An attempt may then be made to test each eye separately.

In testing the color identifying ability of slightly older children who will have at least some knowledge of red and green, they may be asked to pick out a red or green ball from the other balls which are left in the box. This test has been found practical in my hands and I hope others also may find it useful.

*708 Park Avenue.*

* From the Department of Research, New York Association for the Blind, and the Department of Ophthalmology, New York University Post-Graduate School of Medicine. Aided by a grant from The Ophthalmological Foundation, Inc.

† Distributed by R. O. Gulden, Philadelphia 20, Pennsylvania.

‡ Manufactured by J. A. Deknatel and Son, Long Island, New York.

§ Hardy, L. H.: Scotometry: History and technique with a scotometric tangent screen and scales. Tr. Am. Ophth. Soc., **29**:486, 1931.

## REVERSAL OF LENS CHANGES IN EARLY DIABETES

CHARLES A. TURTZ, M.D.
AND
ARNOLD I. TURTZ, M.D.
*New York*

Early diabetes mellitus may be associated with changes in refraction or by a physical change in the appearance of the lens. A shift toward myopia and weakness of accommodation are often seen. Less common are opacities in the posterior subcapsular region of the lens. All of these changes are reversible

with prompt institution of antidiabetic therapy.

### Case report

Mr. A. L., aged 22 years, an assistant purser on a ship, consulted us on February 1, 1955, and gave a history of blurred vision for several weeks. He first noticed this when he went to the movies and was obliged to sit unusually far forward in order to see the screen clearly.

Examination revealed a tall, apparently healthy young male. His past medical history was irelevant except for an eye injury many years ago. Family history was negative. Ocular examination in our office one year before revealed a visual acuity of 20/25 in each eye. Retinoscopy revealed a low degree of hyperopic astigmatism for which corrective lenses did not seem necessary.

At the present examination visual acuity was 20/100, O.D., and 20/70, O.S. (with some squinting). Vision was correctible to 20/25 in each eye by −2.75D. sph., O.D., and −2.25D. sph., O.S. He exhibited obvious weakness of accommodation (near-point of accommodation, 25 cm.). The lids were inflamed and scaly because of chronic seborrheic blepharitis. The corneas were clear, pupillary reactions active, tension and motility normal. Slitlamp examination revealed discrete, pinpoint, scattered subcapsular and cortical opacities in each lens with some tendency for coalescence.

Fundus examination revealed ovoid, well-defined discs of good color. In the left temporal periphery was an area of healed chorioretinitis, possibly traumatic in origin. The vessels were normal. There were no hemorrhages nor exudates.

The patient was referred for a diabetic workup and the studies revealed: Urine, specific gravity was 1.026 and a trace of sugar was present. Blood sugar was 220 mg. He was placed on a diabetic regime and when he returned six weeks later his visual acuity was 20/25, O.U. Accommodation was normal for his age (near-point of accommodation, 12 cm.). Slitlamp examination revealed a complete absorption of the lens opacities.

### Comment

With elevation of blood sugar there is a decrease in aqueous osmotic pressure. The fluid content of the lens cortex is increased, with a corresponding increase in curvature leading to myopia. In addition, the decrease in optical density of the cortex relative to the nucleus results in greater refractive power and further myopia.[1] Accommodative weakness was found in 21 percent of diabetics by Waite and Beetham.[2] Duke-Elder states that the onset is typically sudden and bilateral in young persons, and tends to disappear with institution of therapy. The mechanism is obscure; it may be neural or lenticular in origin. Evanescent lens opacities are difficult to explain except as a further effect of lens cortical hydration, before actual protein denaturation occurs.

### Summary

A young man with blurred vision was found to have developed myopia, accommodative weakness, and lens opacities. The etiology was found to be diabetes mellitus. All changes were reversed by prompt antidiabetic therapy.

*525 Park Avenue.*

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## CORRECTION OF BLEPHAROPTOSIS*

### With a simple surgical technique

Burgos T. Sayoc,† Lieut. Col. (MC)
*Quezon City, Philippine Islands*

In this paper is presented a modification of the Friedenwald-Guyton technique[1]; it offers a simpler procedure to restore function and at the same time to enhance the cosmetic appearance. Although I have used this procedure in some cases with complete paralysis of the levator palpebrae superioris, the indications for its use and the advantages and disadvantages of the technique are outside the scope of this paper.

* From the Eye, Ear, Nose, and Throat Service, V. Luna General Hospital, Armed Forces of the Philippines.
† Chief, EENT Service.


Fig. 1 (Sayoc). (A and B) Reference points to inner and outer canthi (left eye). Line of possible incision is drawn.

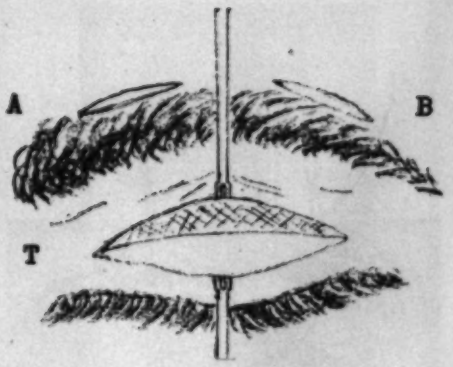


Fig. 2 (Sayoc). Stab wounds from points A and B are made on eyebrow line. Incision is made on the lid, exposing the tarsal plate (T).

PRELIMINARY MARKINGS (on left eye)

On the upper eyebrow line at points A and B (fig. 1), two lines are drawn to fall vertically downward to the inner and outer canthi, respectively. With the eye shut, on the skin of the upper lid, within these lines, the possible line of incision, measured exactly from the height of the superior palpebral fold of the good eye, is drawn; the other eye is treated identically if ptosis is bilateral. Usually, the height of the superior palpebral fold is six to eight mm.

ANESTHESIA

For younger children, operation is done under general anesthesia and for older children and adults, it is done under local.

The local anesthesia used is two-percent procaine hydrochloride with epinephrine hydrochloride, 1:1,000, one drop to every five cc.

Using a three-inch 22-gauge needle directed temporally, the whole length of the left eyebrow line is infiltrated subcutaneously from above the base of the nose. Then the needle is withdrawn and redirected, care being taken to keep it in close apposition to the periosteum over the orbital eminence.

Next, using a 3.5 cm., 25-gauge needle, an injection is made at the center of the superior orbital margin, the point of the needle being directed medially and closely following the orbital margin to avoid penetrating the orbital septum. The anesthesia is injected slowly as the needle advances. On withdrawal, the needle is redirected several times and injection given close to the periosteum. After anesthetizing the medial half, the lateral half is anesthetized in the same manner.

SURGICAL PROCEDURE

1. Two stab wounds, each 10 to 15 mm. in length, are made on the eyebrow line starting from inside of points A and B (fig. 1). The incisions go down to the aponeurosis of the frontalis, which is exposed in both wounds. Then the lid is incised, extending from the nasal to the temporal ends, cutting the skin, subcutaneous tissue, and orbicularis oculi, and exposing the tarsus[2] (fig. 2).

2. Using a two-inch straight needle with 2-0 Deknatel silk suture, a bite is made at the outer corner of wound A (fig. 3), passing through the frontalis fascia across and out at the inner corner of wound B. The needle is then replaced by a Ferguson needle, 0.5 circle, tapered point, no. 720-20. With the aid of a sharp skin hook, the frontalis is raised at point B and a bite of about five mm. is made from the outside (b-1), emerging from the inside at b-2 (see enlarged sketch, fig. 9). At this stage, the curved needle is replaced with the straight needle.

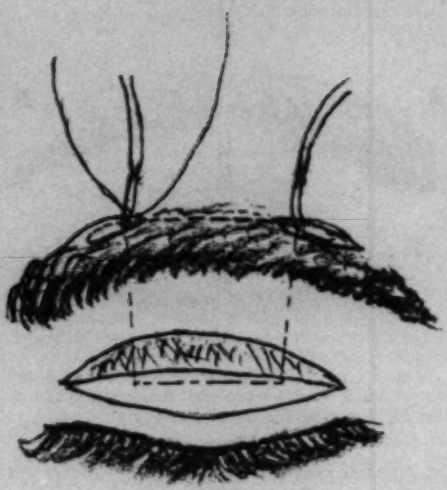

Fig. 3 (Sayoc). Course of suture (Deknatel, 2-0 silk). Bites are taken in the frontalis and tarsus and adjustment loops are placed. See Figure 9 for details.

An adjustment loop (AL-2) is hooked on the suture and knotted about one cm. above point b-2 (fig. 9) (magnified to show details). The straight needle makes a bite at point b-3 going down and under the orbicularis oculi to emerge at the lateral end of the lid incision.

The curved needle is again used, making

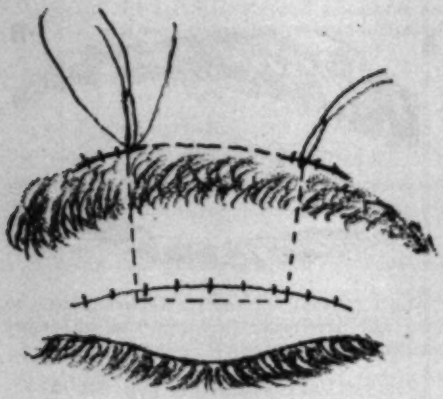

Fig. 5 (Sayoc). Closing of lid and eyebrow incisions.

a bite about 3.0 to 3.5 mm. at the midpoint of the temporal third of the tarsus (see point C, fig. 9) about 2.0 to 3.0 mm. below its anterior superior border. Similar bites are made on the anterior surface of the tarsus at D and E (midpoint of the nasal third of the tarsus). The bites on the tarsus should be deep enough to hold but should not go through and through. Switching to the straight needle, the suture is next carried up under the orbicularis oculi and out at point a-3. Using the curved needle again,

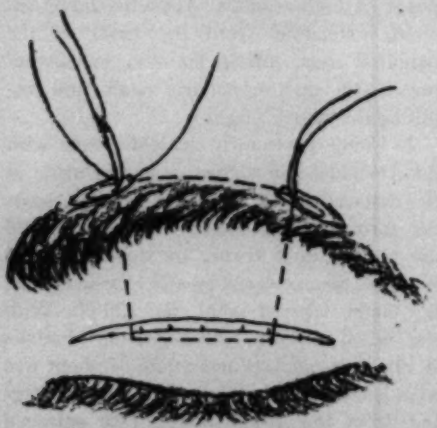

Fig. 4 (Sayoc). Construction of the superior palpebral fold.

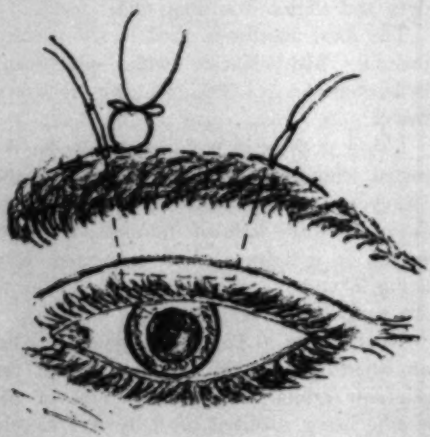

Fig. 6 (Sayoc). Raising of the lid on the first adjustment.

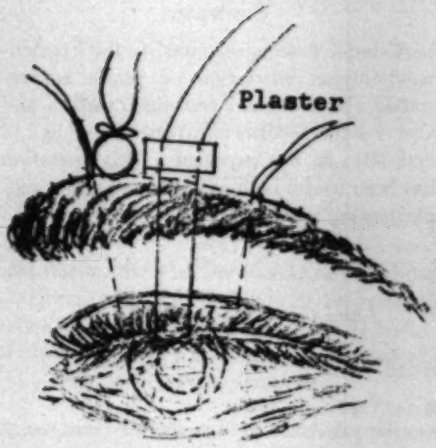


Fig. 7 (Sayoc). Eye closed with Frost suture.

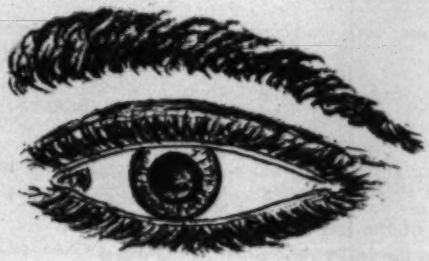

Fig. 8 (Sayoc). Left eye after final correction.

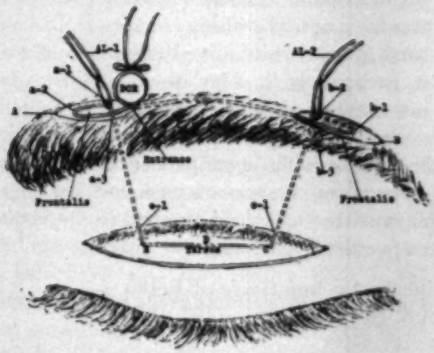

Fig. 9 (Sayoc). Diagram of the course of suture sling (Deknatel, 2-0 silk). Straight needle enters at the lateral corner of A, out at B; curved needle bites at b-1, out at b-2. Straight needle bites at b-3, out at c-1; curved needle bites at C, D, and E. Straight needle enters at c-1, out at a-3; bites at a-1, out at a-2; two ends knotted temporarily over DCR.

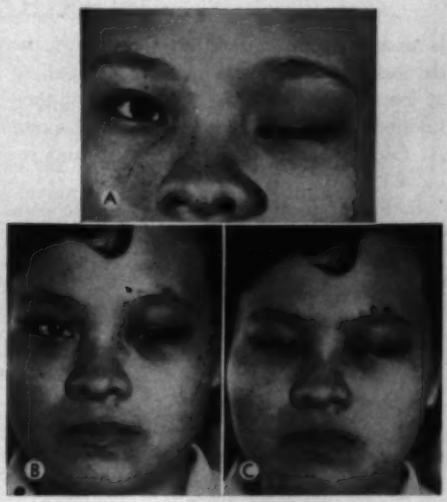

Fig. 10 (Sayoc). Results of operation. (A) Before operation, looking straight ahead. (B) Ten days after operation. (C) With eye closed. Note the scars on the eyebrow line and the newly constructed superior palpebral fold on the left eyelid.

an adjustment loop (AL-1) is applied, the curved needle making a bite on the frontalis inside to point a-1 and emerging at a-2 (fig. 9).

3. With the suture all set but as yet unadjusted, the construction of the superior palpebral fold is then made[3] (figs. 4 and 5).

4. Immediately after the construction of the fold, the two ends of the sling suture are pulled tight and with the use of adjustment loops, AL-1 and AL-2, the necessary corneal overlap can be made readily. The two ends of the sling suture are knotted temporarily on a piece of dental cotton roll (DCR, fig. 6).

5. The small incisions at A and B are then closed with interrupted silk sutures, leaving the adjustment loops (AL-1 and AL-2) to sink down into the incisions (fig. 7).

6. After adequate toilet of the wounds in the brow line and on the lid, a Frost suture is maintained to prevent exposure keratitis (fig. 7). Dressings are changed daily postoperatively.

7. On the third postoperative day, if there is undercorrection, final adjustment of the corneal overlap is made by corrective pulling at loops AL-1 and AL-2. The sling is then knotted permanently at the original point A. Loops AL-1 and AL-2 are cut and removed.

8. Frost sutures and sutures in the constructed fold are removed on the fourth postoperative day, while the sutures on the brow line are removed on the sixth or seventh postoperative day.

### Comment

A simple technique to modify the Friedenwald-Guyton correction of ptosis is presented. This method restores function and also enhances cosmetic appearance (figs. 8 and 10). In my experience, this operation has been useful both as a primary and a supplementary procedure.

*V. Luna General Hospital.*

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### Ophthalmic Miniature

The statement that I excise a third of the iris is decidely erroneous. This would be impossible, as I perform the iridectomy quite in the usual way, by a linear incision. I certainly recommend a larger portion of the iris to be excised than when a simple artificial pupil leucoma adhaerens is concerned, as I prefer in the latter case, from optical reasons (in common with my English colleagues) a small pupil: whilst, in glaucoma, greater experience has taught me, that, particularly in older cases, the excision of a small piece of iris does not exercise so complete and permanent an effect on the intraocular pressure as the excision of a larger piece. . . . Even the advice to perform the excision in the upper part of the iris, when cosmetic considerations are to be taken into account, is found in my earlier work, "On artificial pupil in iritis, etc."; it is repeated in my later work on glaucoma, and has been practised by me for some years.

Letter to Editor by Dr. von Grafe of Berlin,
Ophth. Hosp. Reports, 1:102, 1858.

# SOCIETY PROCEEDINGS

Edited by Donald J. Lyle, M.D.

## OPHTHALMOLOGICAL SOCIETY OF SOUTH AFRICA

September 17 and 18, 1957

The annual meeting of the Ophthalmological Society of South Africa, which was held during the 41st South African Medical Congress week in Durban will be remembered more for its deliberations on the status of opticians than for its scientific interest. Only four papers were presented.

### Von Arlt and Fuchs

Dr. A. Jokl read an interesting paper on two representatives of the Vienna school of ophthalmology—Ferdinand von Arlt and Ernst Fuchs.

### Anterior segment

Dr. L. Staz showed excellent photographs of some congenital and pathologic conditions of the anterior segment of the eye.

### Dispersing vitreous floaters

Dr. Cyril Blumenthal presented a most interesting paper in which he described a method of dispersing mobile vitreous floaters in a degenerate or semifluid vitreous. In brief the method consists of creating a patch of diathermy coagulation at the most dependent part of the eye and allowing the floaters to settle on this patch. The position of the patient and absence of eye and body movements are important. He suggested that the judicious use of coagulation diathermy in healthier vitreous may play a part in encouraging the disappearance of even what are apparently finer fixed floaters (that is, of the cyclitic haze types).

Dr. Blumenthal described a second method for eliminating large central solitary ring floaters. This method is still under test and has not yet been published. In short the idea is to insert into the vitreous through a small valvelike slit at the top of the eye a small steel "bolero" which is then brought back up to the wound by means of a hand magnet. During its journey through the vitreous the "bolero" might entangle the floater.

### Perforating ocular injuries

Dr. Walter J. Levy read a paper on perforating ocular injuries in which he gave interesting figures obtained from a long-term study of 1,303 cases admitted to Moorfields Eye Hospital (London). Of these, 164 eyes were lost (12.6 percent). Half of the eyes removed were lost because of gross injury. Other major causes were infection, dangerous irritability, and shrinkage. The remaining cases were divided into three groups related to the state of the lens—clear lens, 138 (27 percent), localized lens opacity, 45 (8.8 percent), cataract (32.1 percent).

One third of the eyes retained had 6/9 or better vision and 40 percent 6/12 or better. In the clear lens group, 70 percent achieved 6/12 or better, the percentage falling to 55.6 percent with a localized lens opacity, and down to 9.1 percent in cataractous cases. Two-thirds of cataractous eyes had less than 6/60. Corneal scarring only affected vision in 11.5 percent of cases and limbal wounds had no bearing on prognosis.

Over half the cases had iris prolapse and this was most frequent in the lower vision groups. Only three cases of sympathetic ophthalmia occurred. Anterior synechias were most common in the cataractous group, being associated with more severe injury.

Localized lens opacities were most interesting. An average follow-up of five and one-half years revealed that when the opacity was limited in size and there was a rapidly sealing anterior lens capsule, wound stability was remarkable. Over half of this group retained vision of 6/12 or better.

Of the 175 cataractous cases only 55 were aphakic and 113 (over two thirds) required

lens extraction or needling to improve vision. Only nine aphakics were using contact lenses—no acrylic implants had been done in this series. Thus the higher visual results in this group were only potential and would have been better if more operations had been done. The poor prognosis of cataract cases was related more to the extent of the original injury than to the presence of the opaque lens (except when soft lens matter was still proving irritable).

When a view past the lens diaphragm was possible, vitreous hemorrhage and retinal detachment were noted to be responsible for 28 cases (20.3 percent) with vision of less than 6/18.

S. Abel, *Correspondent.*

## OPHTHALMOLOGICAL SOCIETY OF AUSTRALIA

September 30 to October 4, 1957

Mr. Kevin O'Day, *presiding*

The 17th annual scientific meeting of the society was held in Melbourne at the Royal Australasian College of Surgeons.

The proceedings were opened by the Lieutenant-Governor of Victoria, Sir Edmund Herring, who welcomed the overseas guests from England (Sir Stewart Duke-Elder and Mr. P. Jameson Evans) and the United States of America (Dr. Arthur J. Bedell and Dr. Hedwig Kuhn) and stressed the ties of friendship and mutual scientific interests which brought members and visitors together from such far distant lands.

### Vagaries of the pigment epithelium

The President's inaugural address opened with a brief description of the comparative anatomy of the pigment epithelium of Australian mammals, fish, snakes, and birds. He discussed the part played by the pigment epithelium in light adaptation in vertebrates and the pathology of these cells in degeneration, inflammation, and new growths. This paper was profusely illustrated by microphotographs of original specimens prepared by the speaker at the Department of Pathology, St. Vincent's Hospital, Melbourne.

### Hormonal corneal dystrophies

Mr. Darvall, of Sydney, presented a stimulating conception of the treatment of hormonal corneal dystrophies with appropriate androgens and estrogens. The speaker claimed encouraging success in dealing with resistant corneal dystrophies seen in climacteric subjects.

### Keratoconjunctivitis

Mr. P. English and Mr. E. McGuinness, of Brisbane, described a type of chronic keratoconjunctivitis which they thought was seen especially in the warm northern states and was characterized by a stippled staining with bengal rose scattered over the palpebral aperture. There seemed to be two elements, one infective and one associated with the drying effects of wind, heat, and dust.

### Incidence of eye disease

Mr. Jameson Evans' paper stressed natural incidence of ocular disease. This was supplemented by Dr. Ida Mann, from Perth, by an interesting series of observations on the eyes of Australian aborigines. Dr. Mann had completed recently a tour of field research right through central Australia and northern Queensland up to New Guinea. In the course of her talk, she stated that marginal blepharitis was not seen among the natives, and that the corneal lesions so often thought to be post-trachomatous were more frequently the results of leprosy.

### Retrolental fibroplasia

Dr. Kate Campbell, of Melbourne, whose work on retrolental fibroplasia is so well known, described to the members how she first became aware of the part played by injudicious oxygenation applied to premature infants.

At the next scientific session, Dr. Billings of Melbourne spoke on "Refsums syndrome," and Dr. H. Greer, formerly of Lon-

don, now pathologist to the Eye and Ear Hospital, read a paper on "Carcinoma of the conjunctiva."

### Radiotherapy

Mr. A. Joyce, of Melbourne, described his further studies on the radiotherapy of malignant intraocular lesions. He interested members with a report of his method of implantation of radon seeds in the treatment of retinoblastoma.

### Blood vessel changes

Dr. Bedell's paper on "Blood vessel changes in the ocular fundus" was beautifully illustrated with a series of his own color photographs, demonstrating graphically the progress of vascular lesions in various patients through the years.

### Diabetes

There was a combined presentation of "Modern concepts in diabetes" by Dr. H. Pincus Taft, Mr. T. Bignell, and Dr. G. Kurrle, all of Melbourne. These speakers claimed encouraging results in controlling the formation of new vessel proliferation on the surface of the retina by small doses of Xrays, thus averting the final disaster of vitreous hemorrhage.

### Herpes simplex

Another combined presentation was made by Dr. S. G. Anderson of Melbourne, Mr. Phillips of Hobart, and Mr. Jameson Evans. They submitted a symposium on "Herpes simplex infections of the eye." The dangers of corticosteroid therapy were stressed, and methods were described of repairing by grafting the postinflammatory corneal scarring. Research work on the immune reactions to the virus were described.

### Tumors of the parotid gland

Professor Ewing of Melbourne pointed out the many and varied pathologic entities embraced by the Miculicz syndrome and presented a comprehensive and lucid category of these diseases.

### Extraocular muscles

Professor Sunderland, aided by a series of preparations from the Department of Anatomy, University of Melbourne, demonstrated the anatomy of the nerves supplying the extraocular muscles, and pointed out the existence of proprioceptive endings in these muscles.

Mr. K. Redmond of Orange read a paper on the "Use of micro corneal lens in the treatment of keratoconus," and Mr. Serpell of Melbourne presented a series of cases of "Xanthoma of the eyelids," and discussed the treatment and general pathology of this condition.

Mr. Gregory Roberts dealt with the education of legally blind children in New South Wales, and Mr. Bruce Hamilton described the methods of assisting these children in Tasmania at the State Sight-saving School.

Mr. Lamb of Perth discussed the use of human hair as suture material with special reference to the closure of wounds in the surgery of cataract.

Mr. Jameson Evans showed two films of his work: one, on the use of the ring magnet in extracting intraocular foreign bodies and one on the surgery of paralytic squint after sixth-nerve lesions.

### Industrial screening

Dr. Hedwig Kuhn presented a paper on "Methods for industrial screening," whereby the visual efficiency of an individual was correlated with his aptitude for a particular task in industry.

### Closed-angle glaucoma

Sir Stewart Duke-Elder presented papers on "Closed-angle glaucoma" and "Ophthalmological research in the prevention of blindness."

The next meeting of the society will be held in Adelaide from October 6 to 12, 1958. The president will be Mr. Michael Schneider, the vice-president, Mr. V. L. R. Carter, the secretary, Mr. Peter Rogers, and the treasurer, Mr. A. E. F. Chaffer.

Edward Ryan,
*Correspondent.*

# AMERICAN JOURNAL OF OPHTHALMOLOGY

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## THE VIRUS OF TRACHOMA

### A STORY OF THE PAST AND THE PRESENT


SIR STEWART DUKE-ELDER
*Hospitaller, Order of St. John at Jerusalem*


### PART I: THE PAST

Legend has it that in order to provide much needed succor to the Christian pilgrims who had journeyed to the Holy Land from Western Europe, somewhere about 600 A.D. a hospice was instituted on the instructions of Pope Gregory the Great in Jerusalem not far from the site of Calvary and the Holy Sepulchre. The hardships involved at that time in such a journey, usually undertaken on foot and lasting perhaps two or three years, cannot readily be imagined. So useful did the institution become that 200 years later it was rebuilt and enlarged by the Em-

peror Charlemagne the Great who added to it a church and a small library for the benefit of the pilgrims. Little is known about this early hospice other than that it survived in the memory of men; but in 1010 A.D. at a time when the hitherto tolerant Arabs began to persecute the Christians, it was destroyed together with the whole of the city of Jerusalem by the Egyptian Caliph, El Hakim. The need, however, remained, and in 1070 the wealthy community of merchants of Amalfi rebuilt the hospice, placing it in the care of a group of Benedictine monks; dedicated to St. John the Almsgiver, a charitable orthodox patriarch of Alexandria of the 7th century, the monks who conducted the new hospice became known as the Brethren of the Hospice of St. John of Jerusalem.

It is well-known history that the systematic persecution of the Christians led to the Crusades, and when Godfrey de Bouillon led the first Crusade into Jerusalem in 1099, he found the Benedictine hospice in full working order and in the fighting which centered around that city many wounded and sick Crusaders received help and attention from its brotherhood. So much did the fame and popularity of the hospice grow at that time throughout all Christendom—for the Crusades were front-page news throughout Europe—that the Master of the Brotherhood, the Blessed Gerard (fig. 1), was able to free it from Benedictine rule and establish a new and independent Order of Hospitallers of St. John who devoted themselves to the care of the sick and poor, Christian and Arab alike. Shortly thereafter, in order to keep the pilgrim routes open, the Order became partially militarized and combined its charitable activities with fighting in defense of the Christian faith. At the same time, to give greater dignity to the Order, St. John the Almsgiver was replaced by St. John the Evangelist as patron, and the distinctive badge of the Knights of the Hospital, the eight-pointed cross, was worn on their mantles over their armor. Thus was the Order of the Hospital of St. John of Jerusalem established; and, of the great Orders of Chivalry which flourished in the Middle Ages, it alone has survived to have descendants who still carry out the objects for which it was originally founded—the relief of suffering of the sick and injured in peace and war, irrespective of race, class, or creed.

Fig. 1. (Duke-Elder). The Blessed Gerard, the founder of the Order of St. John of Jerusalem, wearing the Cross of St. John on his mantle.

During the period of the Latin Kingdom of the Holy Land, the hospice flourished (fig. 2), but when the Crusaders were expelled from Jerusalem by Saladin in 1187, the Knights-Hospitallers left the city and fought a rear-guard action on the plains and seacoast of Palestine. And when finally the Crusaders lost their last stronghold of Acre in 1291, the spirit of heroism and service of the Order was epitomized in the fact that every one of the Sisters of the Order died at their posts nursing the wounded rather than accept the offer by the Saracens of escape by sea.

Expelled from the Holy Land, the

Fig. 2 (Duke-Elder). The Hospice of the Order of St. John at Jerusalem. A medieval print dating from the time of the Crusades.

Knights-Hospitallers of St. John went to Rhodes and thereafter to Malta and the Order was maintained in England. After the lapse of some 700 years, however, King Edward VII, as Prince of Wales, resuscitated the charitable activities of the Order in the Middle East and established a new hospital in Jerusalem, then part of the Ottoman Empire; and since trachoma and ocular diseases were the greatest social scourges of that area, it was made an ophthalmic hospital (fig. 3). The hospital thrived and expanded until the first World War when it was used by the Turks as an ammunition dump. In 1917 when the British Army under Lord Allenby captured Jerusalem it was blown up by the retreating Turks, but the Order quickly repaired the damage, patients were received again in 1918, and it was formally re-opened in 1919. Thereafter it rapidly expanded until in 1948 it was undoubtedly the show-hospital in the whole of the Middle East.

But again tragedy occurred and when, in 1948, the Arab-Jewish hostilities broke out, the hospital became a strategic point in front-line fighting and it had to be abandoned; today the demarcation-line of barbed wire between the State of Israel and the Arab State of Jordan runs through its garden. In 1948, therefore, the Order opened a temporary hospital in the Old City of Jerusalem close to the site of the original hospice founded 13 centuries previously by Pope Gregory the Great and expanded by Charlemagne.

To the vast Arab population in this region, swollen by hundreds of thousands of refugees, a population materially poor and with the highest incidence of eye disease in the world, it is the only source of ophthalmic relief. During the year 1957 it received the astonishing figure of 158,000 patients, many of them travelling for days to reach the hospitality of its walls.

Fig. 3 (Duke-Elder). The original Ophthalmic Hospital of the Order of St. John in Jerusalem in 1883.

Fig. 4 (Duke-Elder). Architect's drawing of the new Ophthalmic Hospital of the Order of St. John of Jerusalem.

## Part II: The Present

In view of the inadequacy of the present temporary premises, however, the Order of St. John decided to build a larger and newer hospital which today is rising from the ground (fig. 4). But it was decided to do more than this. Up to the present time the hospital had treated those who were already diseased and blind; the intention is now to promote research not only so that treatment may be improved but that the blinding diseases so prevalent in this part of the world may be controlled. A research scheme was therefore inaugurated, primarily to isolate the virus of trachoma, and a research team under the auspices of the British Medical Research Council was sent out to a virus laboratory which had been built at the site of the new hospital (fig. 5). There the team worked largely among the swarming numbers of trachoma-ridden Arab refugees from Palestine. Unfortunately, at the time of the Suez crisis it was expedient for the research workers to leave the Middle East; they were therefore temporarily transferred to Gambia on the west coast of Africa, a country equally trachoma-ridden and, fortunately from the point of view of the research, one in which the trachomatous infection is unaccompanied by the severe secondary infections which complicate the clinical and bacteriologic picture of the disease in the Middle East.

With the team engaged primarily on fieldwork in the Gambia, the more elaborate virologic techniques were undertaken in London at the Lister Institute of Preventive Medi-

Fig. 5 (Duke-Elder). The new virus research laboratory of the Order of St. John in Jerusalem.

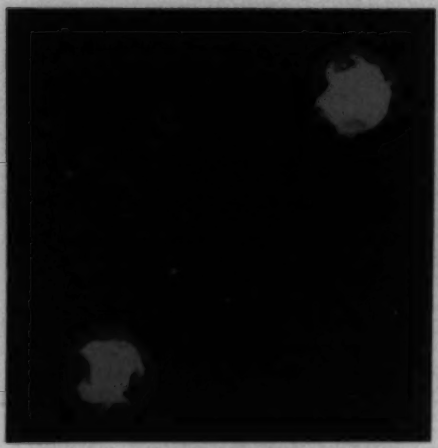

Fig. 6 (Duke-Elder). Electron-micrograph of the virus of trachoma, Chlamydozoon trachomatis (eighth egg passage; ×48,000) (L. H. Collier).

cine and the Institute of Ophthalmology; and during the last two years the research work has progressed more favorably and rapidly than its instigators had the right to expect.

Using a technique elaborated by T'ang and his co-workers (1957) in Pekin wherein the virus is grown in the yolk-sac of eight-day embryonated eggs incubated at 35°C., the virus of trachoma has indubitably been isolated. Preliminary results have already been published (Collier and Sowa, 1958). All the postulates of Koch have been satisfied. The virus has been isolated from patients with clinical trachoma confirmed by the histologic demonstration of the typical inclusion bodies; indeed, in the last series it has been grown from 19 out of 20 such patients. Morphologically it resembles very closely the virus of psittacosis and other members of the Chlamydozoaceae (fig. 6). Inoculated into rhesus monkeys it produces the typical follicular conjunctivitis seen in these animals; inoculated into human volunteers (four have been infected up to date) it produces the typical clinical picture of trachomatous conjunctivitis with conjunctival follicles and keratitis, and from these volunteers the virus has been reclaimed and grown (fig. 7).

The interesting point has already emerged that in the Gambia two strains of virus have so far been isolated. It is just possible that many of the variations in the clinical picture of trachoma (its seriousness in North Africa

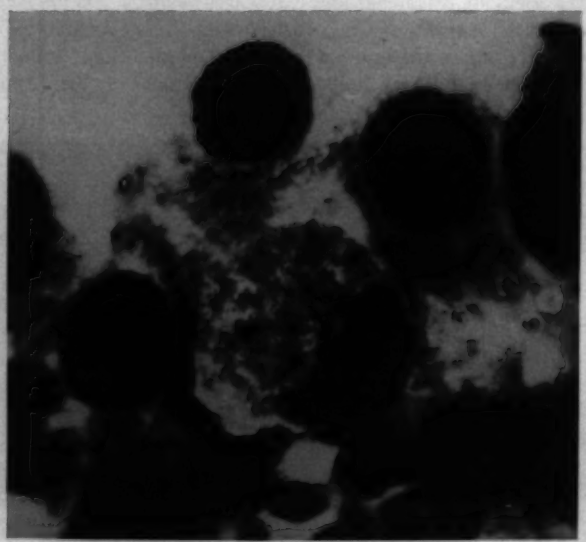

Fig. 7 (Duke-Elder). Conjunctival scraping from a human volunteer subject inoculated with the trachoma virus. A large inclusion is seen filling the cytoplasm of an epithelial conjunctival cell (in the center of the picture). (Stained Giemsa-May-Grünwald, ×1,280) (L. H. Collier).

and the Middle East and its comparative mildness in the Far East and Australasia, the variation in its response to antibiotics, and so on) can be explained by the occurrence of different strains in different parts of the world. This makes it urgently desirable that a study of the virus should be undertaken in as many countries as possible. More significant still, the infection gives rise to serologic changes which suggest that treatment by a vaccine may be not entirely out of court. It is thus possible that in the future a disease which is said by the World Health Organization to affect about one quarter of the inhabitants of the earth and which undoubtedly causes more blindness than any other may be brought under control.


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Collier, L. H., and Sowa, J.: Lancet, 1:993, 1958.
T'ang, F. F., Chang, H. L., Huang, Y. T., and Wang, K. C.: Chin. med. J., 75:429, 1957.


## THE SPRING MEETINGS

The 94th annual meeting of the American Ophthalmological Society was held May 28, 29, and 30, 1958, at The Greenbrier, White Sulphur Springs, West Virginia. One hundred and twenty-one members and 25 guests attended this always pleasant gathering. The president, Walter S. Atkinson, presided genially but firmly at the scientific sessions at which 21 papers were presented. As always, the discussions after the paper were spirited and, in several instances, a paper was discussed by at least five different persons. These broad discussions, with no holds barred for the moment, by men of wide experience are among the most distinctive features of the meeting. The weatherman cooperated but intermittently; nonetheless, the skeet, golf, and tennis tournaments went off as scheduled with the awards as usual favoring the purely forunate as well as the skilled.

At the annual business meeting, William P. Beetham of Boston was spokesman for the Committee on the Howe Medal. As usual, the identity of the recipient was unknown until nearly the last sentence of the report. Because of outstanding contributions to medicine and ophthalmology and particularly the achievement in the field of ocular embryology, the Howe Medal was awarded this year to an honorary member, Ida S. Mann of Australia. The professional indebtedness of each ophthalmologist to Miss Mann's numerous studies and the great affection in which the American Ophthalmological members hold her was reflected in the applause following the announcement. Frederick H. Verhoeff, who has been a member of the American Ophthalmological Society since 1905 and who has participated most vigorously in its scientific affairs, was elected by acclamation to honorary membership. Derrick Vail of Chicago was elected president to succeed Dr. Atkinson. Algernon B. Reese of New York City was elected vice-president succeeding Dr. Vail. Renamed to their posts were Maynard C. Wheeler as secretary-treasurer and Gordon M. Bruce as editor. Ralph O. Rychener was chairman of the council during the past year. Arthur G. DeVoe was named to the council. It was voted to hold the next meeting May 28, 29, and 30, 1959, at the Homestead, Hot Springs, Virginia. The 1960 meeting will be held at the Broadmoor in Colorado Springs, May 17th, 18th, and 19th.

This year, for the first time, a cigarette box was awarded for the most outstanding presentation of a paper. The recipient, John H. King, Jr., of Washington, D.C., spoke on the use of preserved human corneas in the lamellar corneal transplantation and the use of human vitreous preserved by lyophilization. Additionally, he mentioned the use of preserved sclera for reconstructive operations.

The meetings of the American Ophthalmological Society were followed by the joint session of the Section on Ophthalmology of the American Medical Association and the Association for Research in Ophthalmology at the Fairmont Hotel, San Fran-

cisco, June 22nd to 26th. The scientific programs during this week were most crowded and it was literally impossible to attend all of the scheduled activities. A total of 39 papers, each of high quality, was presented at the Association for Research and all day Monday, Tuesday, Wednesday, and Thursday were devoted to papers of either the association or the section. The increasing vitality of research in ophthalmology was demonstrated by the number and almost bewildering variety of papers read before the Association for Research. Each paper had an assigned discussant and many of the discussants presented additional material from their own laboratories. As always with the research papers, the discussant frequently outlined enough work to keep the speaker busy for the coming year or a lifetime.

The Jonas Friedenwald Medal was awarded to his most brilliant student, Bernard Becker of St. Louis, who spoke on "The role of carbonic anhydrase in the formation of aqueous humor." His report was in the truest Friedenwald tradition: rich in trained speculation based upon unique observations and extraordinary hard work. The Proctor Medal of the association was awarded to Algernon B. Reese of New York City for his many contributions to ophthalmology which have ranged from fundamental studies to new surgical techniques. At the evening banquet of the Association for Research in Ophthalmology, Dr. Reese spoke on serendipity in his usual competent and engaging manner. The following day he spoke on the tissue culture of malignant melanomas, demonstrated extraordinary photographs of their growth, and emphasized the importance of the neural crest in their development.

The presiding officer was the senior trustee, Michael J. Hogan of San Francisco. He and the efficient secretary, Lorand V. Johnson, arranged a most interesting program. It is evident that the volume and quality of research in the Americas does not permit it all to be presented at a single national meeting even though combined with sectional meetings. Thus an interim meeting was announced to be held February 19, 20, and 21, 1959, at the Edgewater Beach Hotel, Edgewater, Mississippi. John E. Harris was elected to the board of trustees. Lorand V. Johnson was re-elected to the position of secretary. Honorary membership in the Association for Research in Ophthalmology was awarded to the beloved Georgiana Dvorak-Theobald.

The Section on Ophthalmology of the American Medical Association met under the charming chairmanship of Dohrmann K. Pischel for a most interesting program. A symposium on retinal detachment was featured the last day, with the speakers representing nearly every section of the country. A surprising unanimity of opinion seemed to emerge concerning the indications for the standard diathermy procedure in uncomplicated types of detachments and the use of resection, buckling, and implant procedures for complicated cases or cases which require reoperation. The expected fireworks did not develop and the disagreement, if any, arose on minor questions of pre- and postoperative care rather than on the indications for particular procedures.

As always, the American Medical Association presented a kaleidoscope of interesting meetings, scientific exhibits, and technical exhibits. In the Section on Ophthalmology there were 13 scientific exhibits, each of which was outstanding. The section prize of $250.00 for the best exhibit was awarded to the exhibit of L. K. Garron, M. J. Hogan, W. K. McEwen, and M. L. Feeney of the University of California Medical Center (San Francisco) for their exhibit, "The electron microscopy of ocular tissue." This exhibit also received the certificate of merit for the section. Honorable mention was awarded to G. K. Smelser and George D. Pappas of the Columbia University Medical Center for the exhibit "The electron microscopy of the epithelium of the ciliary body" and to Dan M. Gordon of New York Memorial Hospital Center for his exhibit "Common ocular

problems." The excellence of the exhibits is suggested by the judging on which seven were recommended for awards and four were recommended for the first award.

At the annual business meeting, Frank B. Walsh of Baltimore was elected chairman of the Section on Ophthalmology to succeed Dohrmann K. Pischel. Philip Meriwether Lewis of Memphis was elected vice chairman succeeding Ralph W. Danielson. The following officers were re-elected: Dr. Harold G. Scheie, secretary, Ralph O. Rychener, delegate to the house of delegates, and Frank W. Newell, section representative to the committee on scientific exhibits. Henry F. Allen of Boston was named assistant secretary and William H. Morrison of Omaha was elected alternate delegate. The honor medal of the section was awarded with a touching tribute to his teaching activities and his studies in glaucoma and retinal detachment to Peter C. Kronfeld of Chicago. The chairman's address on "The technique of slitlamp examination of the fundus," exhibited Dr. Pischel's customary comprehensiveness and clinical awareness. The guest-of-honor of the Section on Ophthalmology was Prof. Gösta Karpe of Stockholm, Sweden, who discussed "Indications for clinical retinography."

The section prize of $250.000 was awarded to the paper by Warren A. Wilson of Los Angeles, who presented "Galactacemia with associated cataracts in children," a most interesting genetic and clinical study of this unusual condition. The house of delegates of the American Medical Association voted to hold its next meeting at Atlantic City, June 8 to 12, 1959. They voted additionally not to hold the 1960 meeting in Chicago as had been expected but to meet in Miami Beach, Florida, on June 6 to 10, 1960.

The weather in San Francisco was delightful, the hospitality outstanding, and the opportunities for entertainment nearly unlimited. Nonetheless, the large meeting hall at the Fairmont Hotel was most crowded for all of the section's meetings. The wide diversity of interest of the various investigators was perhaps reflected in the attendance at the Association for Research in Ophthalmology. Some of the sessions had very few in attendance, possibly because there were only a few who understood the topics of discussion. However, the meetings were most enjoyable and all returned home bodily fatigued, but overflowing with information and stimulated with new challenges for another year.

Frank W. Newell.

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### Enzymatic Zonulolysis

Keen interest has been aroused among ophthalmic surgeons over the announcement by Dr. Joaquin Barraquer of Barcelona (Enzymatic zonulolysis: Contribution to the surgery of the lens: A preliminary note. Communication presented before the Royal Academy of Medicine, Barcelona, April 8, 1958) of an enzyme which, if injected into the anterior chamber, apparently dissolves the cement substance of the zonular lamellae so that the lens may be removed with ease.

It is obvious that further studies must be undertaken to verify this important discovery.

Dr. Richard C. Troutman, Professor of Ophthalmology, State University of New York, 450 Clarkson Avenue, Brooklyn 3, New York, is collecting the experiences of ophthalmic surgeons who are working with this material. If those using it would pass on the information they obtain to Dr. Troutman as soon as possible, an editorial will be prepared for The Journal.

Derrick Vail.

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## OBITUARY

### OLGA SITCHEVSKA
### (1895-1958)

Ophthalmology lost one of its widely known woman practitioners and essayists in the death of Dr. Olga Sitchevska of New York, May 20, 1958.

Although she was Russian born and educated, she lived through war and revolution to come to our strange land in 1923 to master the language and customs of the new world. She continued her training in the clinics and the postgraduate school of the New York Eye and Ear Infirmary. She was appointed to the service of the late Dr. Ben Witt Key and promoted to assistant surgeon in 1937. In the meantime, she was appointed as attending ophthalmologist to the New York Infirmary. She maintained these hospital connections to the last.

It was my good fortune to have known Olga Sitchevska for at least 25 years. During this time she was a faithful worker in the clinics of the New York Eye and Ear Infirmary. Patients, workers, employees of the hospital, and her associates will feel her loss. At last, she has gone on to long-deserved rest but her spirit lives on.

Olga Sitchevska was born in Kiev, Russia, in 1895. She was graduated in medicine from the Medical School of Kiev University in 1918 and served an internship at Perm. In 1919, she entered the Russian military service for one year and came to the United States. She continued her training in ophthalmology and became an assistant surgeon of the New York Eye and Ear Infirmary in 1937. During that time, she was appointed attending ophthalmologist at the New York Infirmary. While progressing in her profession, she found time to publish 13 splendid articles in professional journals and was the official translator of Russian articles for THE AMERICAN JOURNAL OF OPHTHALMOLOGY and *Archives of Ophthalmology*.

Dr. Sitchevska was a diplomate of the American Board of Ophthalmology, a member of the New York County and State Medical Societies, and the American Medical Association. She was a fellow of the New York Academy of Medicine and the American Academy of Ophthalmology and Otolaryngology. She was a member of the Association for Research in Ophthalmology and the Russian Medical Society.

The survivors are her husband, Constantine Shulakoff, and sisters and brothers in California.

Dr. Olga Sitchevska was not only a talented ophthalmologist, but she was a devoted, friendly physician, who enjoyed the complete confidence of her patients and friends. She spent many long hours with private and clinic patients alike. She enjoyed her work and was dedicated to the improvement of her specialty and to making the world a better place in which to live.

Brittain F. Payne.

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## BOOK REVIEWS

OCULAR ALLERGY. By Frederick H. Theodore, M.D., and Abraham Schlossman, M.D. (with chapters by W. B. Sherman, M.D., and R. S. Coles, M.D.), Baltimore, Maryland, The Williams and Wilkins Company, 1958. 420 pages, 111 figures, 2 color plates, references, index. Price: $12.00.

In 1933, Alan C. Woods' book, *Allergy and Immunity in Ophthalmology*, appeared. A volume of 167 pages of text and no illustrations, it may be said to have introduced the subject of ocular allergy to ophthalmology. Not much of clinical knowledge of the subject was then known. Since that time the knowledge of ocular allergy and its literature, particularly as it applies to the clinic, has enormously expanded and even special societies having to do with this subject have been organized. It is, therefore, timely that a book devoted exclusively to this topic should appear. We are indeed lucky that it is such a good one.

The authors, widely known for their clinical studies in this and allied fields, have successfully, I think, "correlated and classified the clinical manifestations of ocular allergy in accordance with the various allergic mechanisms involved," which was their aim.

The first chapter by Dr. Sherman, chief of the Allergy Clinic of Roosevelt Hospital, deals with the basic principles of allergy, a subject that should be of great interest to

ophthalmologists, particularly the older ones who may not know too much about it. It is particularly well written and to the point, and a most suitable introduction for the understanding of the ocular allergies. The remaining chapters have to do with reactions of the skin of the lids, conjunctiva (nine chapters), cornea, sclera, uvea, lens, retina, and optic nerve to allergens. Some readers may take issue with the authors for including certain clinical conditions in the allergic group (for example, the syndrome of glaucomatocyclitic crises, or some cases of retinal detachment) but in each instance the authors are quick to point out that the allergic basis for their inclusion is only suggestive and the evidence is still tenuous. Whether or not such items should have been included is a matter that the authors have decided and I think in a book of this kind they were justified.

The principles of treatment of the various diseases are generally sound and accepted practice in view of our present-day knowledge, yet here again controversial issues may arise, according to the readers' own experiences with the clinical treatment of these diseases.

This work is a most valuable summary of our collection of knowledge as developed in the literature and in the extensive experience of the authors. We welcome it enthusiastically and wish it well. It is well written, printed, and adequately illustrated and we are glad to have it for our libraries, ourselves, and our students.

Derrick Vail.

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METHODS IN MEDICAL RESEARCH: Volume 7. James V. Warren, Editor-in-Chief. Chicago, The Year Book Publishers, 1958. 237 pages, author and subject indices. Price: $7.50.

Up to 20 years ago it was possible for the research-minded ophthalmologist to take his microscope and ophthalmoscope in hand and to turn out a creditable piece of work. Alas, this simple armamentarium no longer suffices. The late Dr. Friedenwald was supposed to have said that all the easy things in ophthalmic research have been done. This is certainly true as regards methodology. Study of the lens is now largely enzyme chemistry with its attendant Warburg apparatus. The cornea is now a problem in optical physics and electron microscopy, adequate study of extraocular muscles demands a modified electroencephalograph machine, and even ordinary histologic study is now the province of the histo- and cyto-chemist. When we extrapolate this situation to medicine in general, it becomes obvious that nothing less than a series of texts (of which this is volume 7) will suffice.

The previous six volumes contained occasional sections of interest to the research ophthalmologist. For example, volume 1 had a discussion on cellular respiration, volume 2 a chapter on methods of study of bacterial viruses, and Gomori wrote a section on histochemical staining methods in volume 4. The present volume, however, will be of special interest to the ophthalmologist because the last section is a presentation of methods for study of the histology and cytology of the retina by E. N. Willmer. A wealth of information is packed into this thin 50-page section. The author points out that the retina is a complex structure and the approach to its study must be varied according to the information sought. On this basis techniques are divided into microanatomic, cytologic, histochemical, and embryologic. The beginning worker in this special field would do well to read this section as an introduction to the subject and to use the very adequate bibliography as a guide to further study.

David Shoch.

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OPTICAL AIDS FOR LOW ACUITY. By Russell L. Stimson. Los Angeles, Braille Institute of America, 1957. 33 pages including charts. Price: $10.00.

Stimson, whose extensive knowledge of ophthalmic optics was evident in his fine volume on *Ophthalmic Dispensing* (1951), has

now contributed an original and timely monograph on optical aids for subnormal vision. The current interest in this field has stimulated the establishment of an increasing number of "optical aid centers"; and a full discussion of the topic is scheduled for the 1958 session of the Academy of Ophthalmology and Otolaryngology. In Stimson's new charts near visual acuity can be tested by letters or words as large as 50′ snellen down. A more practical test for the semisighted, who need all the clues they can get, is his chart of running text in various types from 6 point to 24 point.

An important supplemental examination is obtained by his simple central field tests. Each target consists of a series of concentric circles in which the spaces and lines subtend at 35 cm. visual angles of one to 50 minutes. These are used like the Amsler charts, which Amsler discussed most recently in La Revue Chibret No. 27. These targets are placed adjacent to neutral disks of similar contrast. Hence, they are likewise useful for the estimation of acuity in illiterates and for the detection of malingering, especially since the same visual angle is used in targets of different sizes. In macular degeneration—for the same visual angle—the performance with the larger target is usually better than with the smaller, an indication that useful near vision can be obtainable by magnification. Since a marked diminution of contrast occurs in incipient cataract, much magnification is not then acceptable as the contrast is further reduced thereby. Projection magnification is unsuccessful when the light sense is much diminished, as in optic atrophy. When more than twofold magnification is necessary, the desired goal is often best obtained gradually, prescribing first just enough power to see 18 to 24 point type. A list of books published in large type is obtainable from the American Library Association.

One of the many useful tables gives the near visual acuity in equivalents of distance measurement, decimal notation, point-type, Ortho-rater scores, and visual efficiency. As in other recent books and charts the visual efficiency ratings given are those before the 1955 official revision. Visual angles are not noted, but these, being the reciprocals of the decimal notation, are readily calculated.

This authoritative work is more than a book to be read. The charts and tables should prove of daily value in the office of every ophthalmologist concerned with the problem of visual aids.

James E. Lebensohn.

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TRANSACTIONS OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM: VOLUME LXXVII, Session 1957. 697 pages and index. London, J. and A. Churchill, Ltd. Price: Not listed.

This volume includes not only the papers presented at the 1957 session of the Ophthalmological Society of the United Kingdom but also those of its affiliated organizations, the Oxford Ophthalmological Congress, the Midland Ophthalmological Society, the North of England Ophthalmological Society, the Southwestern Ophthalmological Society, the Southern Ophthalmological Society, the Irish Ophthalmological Club, the Scottish Ophthalmological Club, and the Ophthalmological Society of South Africa. It contains 48 papers on almost every conceivable ophthalmologic subject by a host of distinguished British and foreign authorities. There is scarcely a paper which fails to show high standards of scientific and literary excellence but because of the vast scope it is impossible to mention more than a few which particularly impressed this reviewer.

Doggart and Nutt presented excellent reviews of the occurrence, appearance, and treatment of congenital cataract. Shapland reported on intravitreal vitreous in retinal detachment surgery, with cure in two and improvement in four out of 12 cases so treated. Black reported the scleral flap method combined with diathermy in retinal

detachment. Stallard emphasized the value of the anterior approach in advancement of the levator. Franceschetti and Canossa demonstrated a new instrument for taking lamellar grafts.

Several papers were presented dealing with the ocular aspects of diabetes, including one experimental paper by Ashton. Perkins and Beverley gave an analysis of 261 cases of uveitis which showed a high incidence of positive dye tests for toxoplasmosis, with a significantly higher rate of improvement with Daraprim in the patients with Toxoplasma antibodies and concluded that many cases of chorioretinitis and some of anterior uveitis were due to toxoplasmosis. Cashell reported ocular changes in a patient with rupture of the liver.

The Bowman Lecture was given by Duke-Elder on the etiology of simple glaucoma in which he expounded his views as to the neurovascular versus the mechanical theory.

Roper-Hall presented a foreign body locator with a degree of sensitivity higher than for other locators, especially for nonmagnetic particles. In a study of the cases of conjunctivitis seen at Moorfields during 1956, Jones et al. found one fifth of 124 cases to be due to herpes simplex, which was nearly twice as common as the pneumococcus.

At the Oxford Ophthalmological Congress, King, Russell, and Rowbotham discussed the facial neuralgias. Amsler, in a paper, "Disease and time," showed the chronologic development of various lesions photographically. Young described the removal of cataract by the posterior route. Leigh and Ridge discussed the problems of preservation of corneal tissue by freezing. Reed and Bendor-Samuel found an incidence of 2.9 percent of glaucoma in 2,000 consecutive eye examinations of patients over the age of 40 years. Meyer-Schwickerath reported further progress in his method of light coagulation, which had been used on a total of 610 cases, including 85 macular holes and 100 peripheral retinal tears.

The Doyne Memorial Lecture was presented by our own Derrick Vail who spoke on "The zonule of Zinn and ligament of Wieger," and their importance in the mechanics of the intracapsular extraction of cataract.

Spaeth presented a paper on the treatment of monocular aphakia, with advocacy of a contact lens to obtain binocular vision. Other papers included several dealing with rehabilitation of the blind and partially sighted.

Space limits mention of a number of interesting papers from the various other affiliated ophthalmologic organizations. Every ophthalmologist would do well to persue this entire *Transactions*, from which he may gain much clinical and scientific information.

William A. Mann.

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TRANSACTIONS OF THE AMERICAN OPHTHALMOLOGICAL SOCIETY, 1957: VOLUME 55. New York, Columbia University Press, 1958. 805 pages, index. Price: $18.00.

Nineteen papers were presented at the 93rd annual meeting of the American Ophthalmological Society. These plus the 12 theses submitted by candidates make up the present volume. These volumes continue to be of interest because of the completeness and finish of the papers presented. Many of them have a philosophic turn which is appropriate to the seniority of the society and its members. For example, Dr. Rucker's historical presentation of the semidecussation of the optic nerves makes fascinating reading. This concept was apparently placed on a firm footing by the introspective studies of Wollaston who suffered from transient hemianopsia. Dr. Holmes' article on "Leprosy of the eye" is actually a monograph on the subject. It is true that most American ophthalmologists see only one or two cases in their lifetime but an interest in the ills of all mankind has always been a hallmark of the humane physician and Dr. Holmes

states that there are over five million people in the world affected by this disease. Dr. Derrick Vail's presentation on angiomatosis retinae tabulates all the known cases in the literature treated with diathermy. He shows conclusively that this is the treatment of choice for this disease. Drs. Reese and Wadsworth continue their work on lens-hyaloid adhesions which they feel explain the tears in the hyaloid frequently seen after cataract extraction.

The ocular signs of various systemic diseases are always of interest and four papers discuss this facet of ophthalmology. Drs. Wagener and Hollenhorst consider temporal arteritis, Drs. Hogan and Kimura toxoplasmosis, Drs. Newell and Beaman meningioma, and Dr. J. Warren Henderson the optic neuropathy of Graves' disease.

The last paper of the session is by Drs. Scheie and Fleischhauer on atrophy of the iris and ciliary body. They discuss the relationship of the pigment dispersal in this condition to glaucoma. This is appropriately followed by the first thesis, "Pigment changes in the anterior segment in primary glaucoma" by Otto Barkan whose untimely death coincided with its publication. The rest of the candidates seem to have been fascinated by the cornea since no less than seven of the 12 theses deal with this structure ("Artificial corneal implants," by Robert Day; "Bullous keratopathy," by Lorand Johnson; "Penetrating keratoplasty," by Brendan Leahey; "Antibody formation in the rabbit cornea," by James Moore; "Corneal dystrophy," by Robert Ramsay; "Epithelial invasion of the anterior chamber," by Ellen Regan; and "Gonioscopy of cataract incisions," by Harvey Thorpe).

The discussions following each paper are interesting, as usual, but appear to be a little more bland than those of previous sessions; this is apparently due to the absense of Dr. Verhoeff from the meeting.

David Shoch.

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THE MIDDLETOWN LIGHTHOUSE FOR THE BLIND: A SURVEY. New York, American Foundation for the Blind, 1957. 52 pages, paper-bound. Price: 65¢.

Middletown represents a typical city in a small industrial state. Its Lighthouse for the Blind was established 50 years ago when such institutions were, according to the vogue, a combination workshop, vocational school, and boarding house. Times change, and the present survey recommends the elimination of residence in the Lighthouse for both inmates and staff so that all available space and funds can be utilized for a productive workshop, the primary purpose being to assist the blind to achieve economic independence. An Act of 1938 provided for the purchase of blind-made products by the federal government, but of greater significance is the co-operation of industry in the letting of subcontracts for the many types of small-part assembly work which can be done in a workshop. An effective program requires the employment of a workshop director and a production manager. A successful workshop anticipates an operating deficit, which should be no more, however, than one-third of the wages paid to the blind.

James E. Lebensohn.

# ABSTRACT DEPARTMENT

EDITED BY DR. F. HERBERT HAESSLER

Abstracts are classified under the divisions listed below. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is mentioned only in one. Not all of the headings will necessarily be found in any one issue of the Journal.

## CLASSIFICATION

1. Anatomy, embryology, and comparative ophthalmology
2. General pathology, bacteriology, immunology
3. Vegetative physiology, biochemistry, pharmacology, toxicology
4. Physiologic optics, refraction, color vision
5. Diagnosis and therapy
6. Ocular motility
7. Conjunctiva, cornea, sclera
8. Uvea, sympathetic disease, aqueous
9. Glaucoma and ocular tension
10. Crystalline lens
11. Retina and vitreous
12. Optic nerve and chiasm
13. Neuro-ophthalmology
14. Eyeball, orbit, sinuses
15. Eyelids, lacrimal apparatus
16. Tumors
17. Injuries
18. Systemic disease and parasites
19. Congenital deformities, heredity
20. Hygiene, sociology, education, and history

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## 2

## GENERAL PATHOLOGY, BACTERIOLOGY, IMMUNOLOGY

Busse Gravitz, P. **Further contributions to the physiology of keratitis.** Arch. f. Ophth. **159**:459-485, 1958.

The author continued his work on keratitis. He studied the course of an experimentally produced corneal inflammation by cauterizing rabbits' eyes with silver nitrate under a number of different conditions. The results obtained from his numerous experiments are given in the following summary. Central perifocal reaction is most pronounced 24 hours after cauterization and disappears during the following seven days. It seems that extirpated cauterized eyes, after replacement into the orbit, may show histologic pictures completely identical with those obtained from keratitis produced in situ. (7 figures) Ernst Schmerl.

Dufor, R. **Ocular reactions in tuberculosis and focal reactions.** Rev. Med. Suisse Romande **79**:11-16, Jan., 1958.

The allergic type of ocular reaction in tuberculosis is discussed. In addition to phlyctenular disease, episcleritis, iridocyclitis, and chorioretinitis, an epithelial keratitis is described. This is distinguished from the virus type by its diffuse character, its duration of several months, and its clearing when pulmonary or other tuberculous lesions heal. Two cases are presented in which a flare-up of an old ocular lesion was definitely related to tuberculin injection in one and surgery on a tuberculous spine in the other. (2 figures) Edward U. Murphy.

Jawetz, E. **Some virus diseases in fact and fiction.** Tr. Pacific Coast Oto-Ophth. Soc. **38**:1-8, 1957.

The author proves by isolation, rising titers, and experimental inoculation of human volunteers, that adenovirus 8 produces epidemic keratoconjunctivitis, without ever producing any other disease. (4 figures, 2 references) Walter Mayer.

Kyrieleis, Werner. **Myotonic dystrophy.** Münchener med. Wchnschr. **100**:619-621, April 18, 1958.

In a patient with myotonic dystrophy a disturbance of pupillary movement was found that corresponds extensively to the disturbance in striated muscle. There was

no change for five and a half years. The possibility of a pathogenetic explanation is discussed. (1 figure, 10 references)
Irwin E. Gaynon.

## 3

## VEGETATIVE PHYSIOLOGY, BIOCHEMISTRY, PHARMACOLOGY, TOXICOLOGY

Alberth, B. and Darabos, G. **Experimental transplantation of lyophilized vitreous.** Arch. f. Ophth. **159**:596-599, 1958. 1958.

In eight rabbits vitreous was removed by suction and replaced by implantation of lyophilized rabbit vitreous. The tension of the eye was like that of the fellow eye 24 hours later. The vitreous remained clear in all the animals but the retina became detached in two of them. (1 figure, 22 references) F. H. Haessler.

Balaceanu-Stolnici, C., Willenz, A. and Brucar, I. **Ocular functions in animals with experimental lesions of the cerebral cortex.** Ann. d'ocul. **191**:15-25, Jan., 1958.

The authors performed complete decortications on 54 cats in two stages, doing first a left hemidecortication and after one or two months a right hemidecortication. They also performed some localized topectomies. Thereafter ocular functions were measured.

Ocular tension fell markedly after complete or hemidecortication. It returned to normal in 15 to 20 days. Topectomies in the anterior cingular region caused variable changes. In some animals the tension rose, in some it fell, and in some it remained constant. Another function tested was the oculopalpebral reflex, abolished by decortication and contralaterally abolished in animals hemidecorticated. Ocular motility, winking, the audio-palpebral reflex, the corneal reflex, the photomoter reflex and mydriasis were all unaffected by the operation. (4 figures, 17 references)
David Shoch.

Benoit, J. **Role of the eye and the hypothalamus in the stimulation of the genital glands of birds by visible radiations.** Ann. d'ocul. **191**:1-14, Jan., 1958.

The author measured the weight of the testes of ducks before and after exposure to white light for varying periods of time. In every case exposure of the eye (or the orbit) to the light caused an increase in the size and weight of the testes. This occurred even if the optic nerves were cut or the eyes enucleated. This was repeated with monochromatic light and it was found that only the longer wave lengths are effective in stimulating gonadal growth. The author postulates a pre-hypophyseal center as the source of gonadal stimulation and he feels that this center can in turn be stimulated by visible-light excitation of the retina or by a direct route via the tissues of the orbital region. (6 figures) David Shoch.

Bessho, T. **Influence on the retinal metabolism of cortisone and hydrocortisone.** Acta Soc. Ophth. Japan **61**:2178-2186, Nov., 1957.

Cortisone and hydrocortisone were given to rabbits subconjuctivally. The eyes were removed at varying intervals after the injection and the retinal respiration was measured by Warburg's method. By cortisone a reduction in $QO_2$ by 24 percent resulted in one hour in the eyes on the injected side. It took one week to recover the normal respiration. By hydrocortisone the same reduction resulted in one hour, but it took three weeks to recover the normal respiration. The effect on the eyes of the noninjected side was greater by cortisone than by hydrocortisone. Cortisone caused an 8-percent reduction of $QO_2$ while hydrocortisone gave only a 2-percent reduction. (2 figures, 4 tables, 60 references) Yukihiko Mitsui.

Bettman, J. W., Fellows, V. and Chao, P. **The effect of cigarette smoking on the**

**intraocular circulation.** Tr. Pacific Coast Oto-Ophth. Soc. **38**:39-57, 1957.

The authors observed cats after exposing them to cigarette smoke through the inhalation tube on the breathing machine; $P^{32}$ in the blood showed that nicotine increased the total volume of blood in the eye. This method could not be applied in man, as the dose of $P^{32}$ would have had to be greatly increased in order to be measured. The authors therefore took fundus photographs before, during and after smoking, and studied two points of the arteries and of the veins, identical in all 18 patients. After studying the photographs under a microscope, they concluded that only a very small number of the patients showed any arteriolar constriction, and that more constriction was found in veins than in arteries. The authors suggest that in view of the finding of increased blood volume noted through scleral windows in cats, one must suppose that the nicotine constricts the peripheral vessles and sometimes the retinal arteries and that this constriction brings about a dilatation of choroidal vessels. (8 figures, 1 table, 28 references) Walter Mayer.

Borello, Carlantonio. **Behavior of the blood-aqueous barrier in the presence of O-antistreptolysin.** Rassegna ital. d'ottal. **26**:269-282, July-Aug., 1957.

The author emphasizes that much progress has been made in the study of the passage of antibodies across the blood-aqueous barrier. His aim has been to ascertain whether the percentage of O-antistreptolysin in the blood of individuals before acute infections is sufficient to overcome the infection. It is observed that in the blood of clinically healthy persons there are always some antibodies in the aqueous. (2 tables, 84 references)

Eugene M. Blake.

Cuccagna, F. **The action of glutamic acid and of vitamin $B_6$ on regeneration of corneal nerve fibers.** Arch. di ottal. **61**: 389-400, Sept.-Oct., 1957.

The anatomy of the corneal nerves is discussed in detail. Forty rabbits of equal weight and type were used in these experiments. In one eye the corneal nerves were cut by a circular limbal incision. Ten rabbits used as controls showed recovery of corneal reflex blink with a standard 50 milligram stimulus after 29.1 days. Ten rabbits which were given 2 gr. of glutamic acid orally daily for the period of the experiment recovered the corneal reflex in 25.9 days. Ten rabbits treated with vitamin $B_6$ intramuscularly every day recovered in 23.4 days. Ten rabbits receiving both glutamic acid and vitamin $B_6$ recovered the corneal reflex in 18.9 days.

The effect of glutamic acid on transaminization of proteins in the nerve cells, and the effect of vitamine $B_6$ as a co-enzyme are discussed. (1 figure, 1 table, 26 references) Paul W. Miles.

Cuccagna, Franco. **Regeneration of the corneal nerves of the rabbit in relation to age and the administration of steroids.** Rassegna ital. d'ottal. **26**:333-351, Sept.-Oct., 1957.

Rabbits of various ages were exposed to total, circular, juxtalimbal corneal incision and then given ACTH, cortisone, or prednisone parenterally. In a second group the same preparations were given locally. It was shown that the defect healed more rapidly in younger animals than in older ones. Deep sensibility appeared earlier than superficial and the systemic use of hormones produced no effect while surface medication increased the return of sensation. (2 figures, 3 tables, 30 references) Eugene M. Blake.

De Conciliis, Ugo. **Glutathione in the cataracta complicata of experimental anaphylactic uveitis.** Arch. di ottal. **61**:379-388, Sept. Oct., 1957.

Glutathione has a prominent role in lens metabolism, and exists in oxidized and in reduced form (GSH). In man the normal concentration in the lens has been reported 175 mg. percent which becomes 32 to 73 mg. percent in mature cataracts.

Cataracts were produced in 18 rabbits by injecting 0.1 cc. of horse serum into the vitreous chamber of one eye near the lens. After seven days 5 cc. of the horse serum was injected intravenously. After 10 days the treated lenses were transparent; after 15 days some opacity occurred in the posterior lens cortex; after 20 days all treated lenses were opaque.

The reduced glutathione was measured in all lenses by a method described in detail. In the rabbits killed after 10 days the normal lens showed 399 mg. percent, the cataractous lens 312. After 15 days the normal lens showed 398 mg. percent, the cataractous lens 165. After 20 days the normal lens showed 399 mg. percent, while the cataractous lens showed only 20. (3 tables, 21 references) Paul W. Miles.

Drischel, H. and Schaubitzer, H.-G. **The influence of procaine on the kinetics of the human pupil.** Klin. Monatsbl. f. Augenh. **132**:170-179, 1958.

The authors use a pupillographic method modified after Loewenstein. The procaine was either instilled into the conjunctival sac or injected intravenously. The effect was similar and the result was a so-called "hypokinetic" type of reflex. It consists of a prolongation of the entire reflex, accelerated constriction and deceleration of the dilatation. This points toward a parasympathetic preponderance during this reflex. (6 figures, 13 references) Frederick C. Blodi.

Drischel, H. and Zett, L. **The influence of digitalis on the light reflex of the human pupil.** Klin. Monatsbl. f. Augenh. **132**:305-311, 1958.

Five to eight pupillograms were taken on persons in whom two drops of a 0.2-percent digitalis solution had been injected into the conjunctiva. The so-called hypokinetic form of the reflex was elicited. The total reflex period was prolonged with a slowing of the dilatation phase. Similar results were obtained with stronger digitalis concentrations. This was explained as a relative predominance of the parasympathetic influence upon the pupillary reflex. (3 figures, 10 references) Frederick C. Blodi.

Heer, Giuseppe. **Phase-contrast microscopic study of the blood-aqueous barrier in hemorrhagic glaucoma.** Rassegna ital. d'ottal. **26**:283-298, July-Aug., 1957.

In seven patients with hemorrhagic glaucoma who were studied with the phase-contrast microscope, an acute or subacute augmentation of permeability to fluorescein was found. A feature of great importance is the presence of uveal congestion. In diabetic subjects there was an increased permeability to fluorescein, both in acute glaucoma and in rubeosis iridis. (10 figures, 15 references) Eugene M. Blake.

Kleinert, Heinz. **Visible aqueous flow after partial removal of the aqueous from the anterior chamber.** Arch. f. Ophth. **159**: 449-458, 1958.

The author used normal and glaucomatous subjects and injected 1/10 percent solution of fluorescein into the anterior chamber. He produced a slightly diminished ocular tension by removal of some of the aqueous and found that with a diminished ocular pressure the aqueous flow starts when a certain—individually variable—tension is reached. At first some, later on all the aqueous veins fill, as could be observed with corneal microscope and slitlamp. (5 figures, 1 table, 6 references) Ernest Schmerl.

Langham, M. E. **Aqueous humor and control of intraocular pressure.** Physiol. Rev. **38**:215-242, April, 1958.

In this excellent review the author has correlated our knowledge of the formation and circulation of the aqueous humor to form a basis for an understanding of the physiologic process maintaining a constant intraocular pressure. (190 references)

Melian Perez-Marin, Jose M. **Studies on the protein content of the secondary aqueous humor.** Arch. Soc. oftal. hispano-am. **18**:167-173, Feb., 1958.

This is a preliminary report of an electrophoretic study of the secondary aqueous. One of the objectives was to determine the length of time it takes for the secondary aqueous to lose its elevated protein content. The second objective was to determine whether the protein of the secondary aqueous, with the elevated protein content, maintains the normal distribution of the various protein fractions or whether this normal relationship is upset. At first the author established his own normal electrophoretic curves for rabbits. Then he examined secondary aqueous obtained 20 minutes to 24 hours after puncture of the anterior chamber. In addition to taking the electrophoretic curves, the Pandy reaction was done in each case. The data obtained 20 minutes after puncture of the anterior chamber confirmed Verrey's findings. The Pandy reaction becomes negative between 14 and 20 hours after the puncture. The electrophoretic curves in aqueous obtained one half hour after the puncture of the anterior chamber show normal albumen but the relationship of the various protein fractions is changed, the gamma globulin having increased 24 percent. The protein fractions of the secondary aqueous do not correspond to their distribution in blood serum, as does that of the primary aqueous. The increased proportion of gamma globulin is a factor in the increased transport of immunizing bodies. This justifies the use of a puncture of the anterior chamber or compression of the globe as a therapeutic procedure in inflammatory lesions which are practiced in the author's clinic. (4 figures)

Ray K. Daily.

Nover, A. and Berneaud-Kötz, G. **Experimental study of the permeability of conjunctival vessels.** Arch. f. Ophth. **159**: 582-595, 1958.

Dys- and paraproteinemia is often associated with hemorrhage and dilatation of the veins in the retina and sludged blood in the conjunctival vessels. Similar phenomena in patients with plasmocytoma or macroglobulinemia suggested these experiments. The intravenous application of a high molecular and highly viscous colloid (Kollidon 90) led to distinct sludging of the blood and conspicuous reduction of the rate of circulation. Measurements of viscosity showed a definite relationship in the rate of flow of the blood and of the aggregation of erythrocytes.

Another series of rabbits was sensitized heterologously. A definite increase of the $\gamma$ globulin fraction is accepted as evidence of antibody formation. There was little evidence of hemodynamic changes in the conjunctival vessels, only slight granulation of the bloodstream. The combination of both procedures in application of a viscous colloid and heterologous sensitization always lead to conjuctival hemorrhage. (9 figures, 1 tables, 40 references)

F. H. Haessler.

Remky, H. **The pathophysiology of the blood-aqueous barrier for proteins.** Arch. f. Ophth. **159**:600-608, 1958.

Electrophoretic study of the aqueous of 60 patients with uveitis proved to be of questionable value in diagnosis or differ-

ential diagnosis. The micromethods of quantitative and qualitative protein analysis which were used are described. Data on the relationships between various factors such as albumin in aqueous and serum and γ globulin to β globulin are recorded. (8 figures, 5 tables, 14 references)

F. H. Haessler.

Ricci, A. **Further researches on experimental iodoacetic acid cataracts.** Arch. di ottal. **61**:411-431, Sept.-Oct., 1957.

The author gave 20 mg. per Kg. intravenous iodoacetic acid, neutralized immediately by sodium hydroxide, pH 7.5 to 14 rabbits; after 24 hours, 15 mg. per Kg. was injected and after 10 days, another 20 mg. per Kg. A group of three pregnant rabbits was given even larger doses.

There was a profound change in the ocular circulation, manifested by exudative changes in the retina. Histologically there were posterior cortical lens opacities closely resembling cataracta complicata in man. The lens fibers became dissociated, and there were granular changes especially near the suture lines. There was preequatorial vacuolization. There was an evident alteration of the primitive germinative epithelium of the lens with migration of cells irregularly behind the equator as described previously by Cibis. The intrauterine fetal eyes were not damaged more nor differently than adult eyes, despite the difference in mitosis in the epithelium. (3 photomicrographs, 19 references)

Paul W. Miles.

Rossi, Antonio. **Blood chemistry in diabetic rubeosis.** Rassegna ital d'ottal. **26**: 241-245, July-Aug., 1957.

Clinical and experimental studies have emphasized the importance of the polysaccharides related to the protein of the blood in diabetics. This is particularly true when there are alterations of the vessel walls. The large quantity of protein in diabetic blood combined with vascular changes accounts for many features of rubeosis of the iris. The author shows in two tables the percentage of the total protein, polysaccharides and mucoprotein. (2 tables, 6 references)

Eugene M. Blake.

Roveda, Jose Maria. **Aqueous veins.** Arch. oftal. Buenos Aires **32**:339-347, Dec., 1957 and **33**:9-36, Jan., 1958.

This is an extensive review of the whole subject of the topography, morphology and physiology of the aqueous veins. The blood influx phenomenon and the aqueous influx phenomenon (Ascher's compression test) are discussed in detail, as are also Kleinert's backflow phenomenon and the several techniques devised for the measurement of pressure in the collecting, episcleral veins. (55 figures, 51 references)

A. Urrets-Zavalia, Jr.

Sanchez Salorio, M. **Utilization of Wood's light in fluorescein studies of the anterior chamber.** Arch. Soc. oftal. hispano-am. **17**:1373-1376, Dec., 1957.

For an estimate of the blood-ocular barrier the author injects 3 cc. of sodium fluorescein intravenously, and notes the appearance of the dye in the anterior chamber under illumination with a mercury ultraviolet light. He points out that this is an entirely qualitative method, the assessment of the results depending on the observer's experience. (4 figures)

Ray K. Daily.

Sbordone, G. **The glycogen content of the normal rabbit retina in some experimental conditions.** Arch. di ottal. **61**:357-365, Sept.-Oct., 1957.

The history of methods of determining retinal glycogen is discussed. In ten rabbits the normal retina showed 177.7 + 13.0 mg. percent of glycogen. Twelve rabbits were given 1 cc. of 4.5 percent sodium iodate solution intravenously for eight days. After 20 days the retinal glyco-

gen became 106 mg. percent. After 30 days this was reduced to 97 mg. percent; and after 50 days it became 89 mg. percent. Four other rabbits were treated with Ditizone which is a "stabilizer" used for diabetes mellitus. In these rabbits the blood sugar diminished and also the retinal glycogen. (3 tables, 10 references)

Paul W. Miles.

Sorsby, A. and Ungar, J. **Neomycin in ophthalmology.** Roy. Coll. Surg. Ann. **22**: 107-116, Feb., 1958.

Because of the widespread and effective use of penicillin a high percentage of ocular infections are now due to penicillin-resistant strains of staphylococcus aureus or to gram-negative bacilli insensitive to penicillin. Sorsby reports the results of experimental and also some clinical evaluation of a number of other bacteriocidal substances. It seems likely that neomycin provides a satisfactory method of treatment of intraocular infections. (5 tables, 8 references)

F. H. Haessler.

Straub, W. and Krause, G. **Cystein as protection against radiation.** Arch. f. Ophth. **159**:667-679, 1958.

In six series 35 rabbits were injected with 10-percent cystein solution about two hours before exposure to X-rays (1000 to 2000 r). The radiation caused no conjunctivitis, epilation or cataract. Cystein given immediately before the radiation was not protective. Two exposures to 500 r X-ray each, when preceded by an injection of cystein two hours before the exposure to radiation did not bring about cataract. A single exposure to radiation of 2000 r two hours after cystein injection led to development of cataract and epilation. In animals which were given two exposures of 1000 r each and preceded by cystein injection two hours before, no conjunctivitis followed as it did in control animals and the development of lenticular opacities was retarded and total cataract was prevented. (5 figures, 6 tables, 30 references)

F. H. Haessler.

Vannini, Angelo. **The presence of complex prothrombin in human aqueous.** Rassegna ital. d'ottal. **26**:265-268, July-Aug., 1957.

The search for prothrombin in human aqueous had been negative in all tests when the quantity removed was 0.10 cc. while in four of ten instances when the amount removed was 0.20 cc. the tests were positive. It seems probable that there is no prothrombin in the normal aqueous but that the manipulation of tissues in the test produces an alteration of the blood-aqueous barrier. (12 references)

Eugene M. Blake.

Vannini, Angelo. **The so-called factor of acceleration of blood coagulation in human aqueous.** Rassegna ital. d'ottal. **26**: 321-326, Sept.-Oct., 1957.

A qualitative evaluation of the elements of the aqueous is not readily obtained by chemical methods but it is possible to determine the amount of fibrinogen and, more particularly, of the prothrombin which must first be corrected after concentration of the aqueous. Human aqueous obtained at the time of cataract extraction was compared to that of the rabbit; the concentration was 50 times as great in the rabbit as in man. (15 references)

Eugene M. Blake.

Zinnitz, Fritz. **The influence of visible light on the vegetative system of the mouse.** Klin. Monatsbl. f. Augenh. **132**:161-170, 1958.

The effect of white or colored light on the running activity of mice was measured. Some of the animals received acetylcholine, others epinephrine. Two types of reaction to light were noted. One type showed a sympathetic response, the other a parasympathetic response. (8 figures, 5 references)

Frederick C. Blodi.

## 4

## PHYSIOLOGIC OPTICS, REFRACTION, COLOR VISION

Casanovas, Jose. **Audio-visual synesthesia.** Arch. Soc. oftal. hispano-am. **17**: 1185-1208, Oct.-Nov., 1957.

This is a review of the literature on the psychological association of various sensory perceptions, particularly of the audio-visual associations. Reference is made to the numerous examples of synesthesia in color and tone in plastic art and musical compositions. A questionnaire on sensory synesthesia was sent to students of psychiatry and to students of the schools of music and plastic arts in Barcelona and Salamanca. The replies of the students from each city are analyzed as to the association of vowels and musical notes with color. The author believes that audio-visual synesthesia will create a new pathway for psychologic exploration. (8 figures, 3 tables, 25 references)

Ray K. Daily.

Diamond, Stanley. **Acquired myopia in airline pilots.** J. Aviation Med. **28**:559-568, Dec., 1957.

Pre-hire refractions of 67 pilots were studied. These men initially had at least 20/20 vision and five to 18 years of flight duty; 16 pilots, who later acquired myopia had emmetropic or mild myopic pre-hire refractions. Fifty-one pilots who maintained normal vision had predominantly hyperopic pre-hire refractions. Thus, 20/20 vision alone appears to be an insufficient ocular criterion for long-continued visual efficiency. Pilot candidates with emmetropia or mild myopia may progress toward greater myopia. Hyperopia greater than +0.675D appears to be a safeguard against later development of defective vision due to acquired myopia. The findings were of significance in regard to ocular criteria for high selectivity of pilots where long-term maintenance of normal visual efficiency is of prime importance.

Author's summary.

Efron, Robert. **Stereoscopic vision. I. Effect of binocular temporal summation.** Brit. J. Ophth. **41**:709-730, Dec., 1957.

The complex apparatus consisted of equipment for monocular, binocular and alternating vision for variously spaced and sized objects, still and in motion, with timing devices for measuring the intervals of alternating vision between the eyes. It was discovered that a scene flashed in one eye set up a percept somewhere within the visual system which persisted for a measurable period of time and could later be used by the brain for a complex integrative process such as stereoscopic fusion. This could be called memory of positions. If a slightly different stimulus is presented to the second eye within a proper time interval, the brain is still able to fuse the two, which action results in a sense of depth. This time interval was found to be necessarily less than six to 13 microseconds. The memory in alternation is concluded to be a process within the central nervous system rather than within the retina and is in contrast to flicker fusion which is held to occur within the retinal neurones. It had been supposed that varying the intervals of alternation either way would destroy stereoscopic vision. This was found to be true only when the interval was lengthened; if the interval was shortened it had no effect. (13 figures, 5 references)

Morris Kaplan.

Holland, Gerhard. **Tonic phenomena during fusion.** Arch. f. Ophth. **159**:529-539, 1958.

It is known that in natural and experimental heterophoria a rapidly and continuously working shutter placed in front of one eye produces diminished distance

between the double images and shorter and shorter times of fusion. The author systematically studied the time of fusion in a person with an esophoria of 5° and normal vision. He found, in the beginning, increasingly faster fusion times, and later shorter fusion time until the shutter covered the one eye for about eight seconds and the time of fusion returned to the value at the beginning of the experiment. From this finding the author draws the conclusion that some tonic innervation is maintained until the time of covering one eye reaches about ten seconds. (2 figures, 1 table, 19 references)

Ernst Schmerl.

Mackensen, G. **Reaction time in amblyopia.** Arch. f. Ophth. **159**:636-642, 1958.

Reaction time was measured in 26 subjects with unilateral amblyopia and compared with that of normal persons. The time between exhibition of the stimulus and movement of the eyes is usually longer in the amblyopic eye than in the normal one. The difference in time is increased when the stimulus is made centrally rather than on a peripheral portion of the retina. The slowing of the reaction probably occurs in the sensory portion of the pathway, either in the retina or the cerebral cortex. (6 figures, 7 references)

F. H. Haessler.

Marcello Carreras, Enrique. **Micropsia and macropsia of the cyclopean eye.** Arch. Soc. oftal. hispano-am. **17**:1365-1369, Dec., 1957.

This is a follow-up contribution on the subject discussed in a previous communication, to demonstrate that the cyclopean eye which in binocular vision has the same significance as the nodal point of a single eye, and from which is determined the apparent size of objects seen binocularly is, contrary to Hering's theory, not immovable but is displaced forward in convergence. An experiment to demonstrate the micropsias and macropsias produced by this physiologic phenomenon and found only in near vision is described. They are differentiated from the pathologic distortion of images caused by retinal disturbances by the fact that the latter are present in distant vision as well. (2 figures)

Ray K. Daily.

Marin-Amat, M. **The mechanism of vision.** Arch. Soc. oftal. hispano-am. **17**: 1244-1339, Oct.-Nov., 1957.

This extensive monograph has two objectives: to review the knowledge on visual physiology and to highlight the contribution of Spanish investigators in this field. The monograph is divided into five chapters. The first deals with the anatomy of the visual apparatus, the second with the retinal physiology and theories of vision. The third is a detailed exposition of the "Integral theory of vision" by Manuel Maluquer, a highway engineer, who became interested in the study of visual physiology and to whom Marin gives credit for the development of color television. The fourth chapter analyzes the visual principles of television, and the fifth deals with the author's conception of the mechanism of vision based on the material reviewed. (11 figures, 11 references)

Ray K. Daily.

Oppel, O. and Kranke, D. **Studies comparing dark adaptation in normal and amblyopic squinting eyes.** Arch. f. Ophth. **159**:486-501, 1958.

The authors state that little is known about differences in dark adaptation between normal and squinting and amblyopic eyes. The authors studied this problem in 30 patients with squint. Between normal and squinting eyes significant differences of the adaptations were seen in the area of Kohlrausch's bend. Here more than two-thirds of the

patients showed a diminished sensitivity in the amblyopic eyes. Kohlrausch's bend normally is the point of break of the adaptation curve produced by the increasing sensitivity of the retinal rods. In amblyopic eyes the change in the shape of the adaptation curve seems to be produced by a decreased sensitivity of the cones. (11 figures, 4 tables, 16 references)

Ernst Schmerl.

Oppel, O. **Has the infant a gradually widening, tubular visual field?** Klin. Monatsbl. f. Augenh. **132**:189-197, 1958.

The author disputes Engelking's theory of a tubular field in infants. When tested with a light they appear to have a full field after the age of two weeks. The development of vision in infants begins with a diffuse perception of light and dark (hypothalamic vision) and proceeds to a perception of movements. Only after the age of four months does the macular vision gain preponderance. Before that the vision of an infant can be compared with a high degree of amblyopia in an adult who has only excentric fixation. (5 figures, 16 references) Frederick C. Blodi.

Pickford, R. W. **Color vision of three albinos.** Nature **181**:361-362, Feb. 1, 1958.

Three albinos examined with the anomaloscope were found to have a red deviation almost equivalent to simple protanomaly. (2 tables) Irwin Gaynon.

Rose, Albert. **Quantum effects in human vision.** Adv. Biol. & Med. Physics **5**:211-242, 1957.

We call attention to this article which can not be effectively abstracted.

Sachsenweger, R. **Sensory fusion and squint.** Arch. f. Ophth. **159**:502-528, 1958.

The author studied the problem of sensory fusion in connection with the question of pathogenesis and treatment of squint. He describes his methods. Even normal persons show pronounced differences in quality of sensory fusion. Sensory fusion of the adult does not seem to be due to "Anlage." Secondary factors effective during the years of growth seem to be of major importance. Unilateral squint often is associated with excessive dominance of one eye. Squint might be cause as well as effect of poor sensory fusion. In functional treatment of squint the importance of training of the sensory fusion is emphasized. (14 figures, 3 tables, 35 references)

Ernst Schmerl.

Sorsby, A., Benjamin, B., Davey, J. B., Sheridan, M. and Tanner, J. M. **Emmetropia and its abberations: a study in the correlation of the optical components of the eye.** Med. Rec. Council, Spec. Rep. Ser. **293**:1-69, 1957.

A review is given of the biometric investigations on refraction that have followed the pioneer work of Steiger at the beginning of the century. The essential implications of Steiger's work have been confirmed; all the components of refraction have a normal distribution in the general population, though the fit is not as good for axial length as for the other components. However, Steiger's assumption that there is free association of these variables has been disproved. Instead, it has been found that there is a correlating mechanism which makes for a higher proportion of emmetropes in the general population than would be expected on the basis of free association; in addition the extremes of refraction, especially the high myopes, appear to lie outside the range of normal distribution. Correlation—the antithesis of Steiger's assumption of free association of variables—is in fact the focal issue in an understanding of emmetropia and the deviations from it.

The present study is mainly devoted to an analysis of the optical structure of the emmetropic eye. It shows that a wide range of axial length, corneal powers, and

lens powers is seen in emmetropia, the respective values being 21 to 26 mm., 38 to 48 D., and 17 to 26 D. In the emmetropic eye there is a high correlation of axial length with both the cornea and the lens. The emmetropic eye is thus not the end result of a haphazard combination of variable components, but a coordinated organ. The individual emmetropic eye, like the excess of emmetropes in the general population, is not accidental.

It is shown that, with few exceptions, values for axial length, corneal power, and lens power, of the order commonly seen in emmetropia, recur in the ametropias up to ±4.0 D. of ocular refraction. These eyes are ametropic, not because of any abnormal constituents, but because of faulty correlation of the individual components, and the degree of ametropia is the measure of the degree of faulty correlation.

Refraction between 0 and ±4.0 D. appear to account for some 98 percent of all refractions in the general population, judging by a representative curve such as Strömberg's.

Observations on 21 family groups have given inconclusive results, except for the support they lend to the suggestion that the retina determines corneal power. Further studies are needed on both the growth of the eye and the inheritance of refraction. (10 figures, 26 tables, 66 references) Authors' summary.

Zanen, J., Wibail, R. and Meunier, A. **The achromatic foveal threshold in congenital dyschromatopsias.** Bull. et mem. Soc franç. d'opht. 70:80-105, 1957.

The varions diagnostic methods at hand are evaluated and the authors' own modifications of the usual techniques are described. A scotometer built by Haag and Streit two years previously was the instrument of choice. The exposure time, rest periods, filters for pure monochromatic light and strict macular fixation were under constant expert control.

Ten normal persons were tested first and the results are presented in graphs. The intermediary normal curve resembles the curves charted by other authors with different methods of examination. Attention is called to the extended plateau between wave lengths of 541 to 643 millimicrons, also to the gradual and partially indented elevation in the region of the short waves, to the more abrupt slope toward the long wave end of the spectrum and the consistent small notching at the level of a wave length of 575 millimicrons.

Seven protanopes and seven deuteranopes were also examined. The pattern of the curves of the protanopes was slightly different from the graphs made by Hecht and Hsia. The same was true for the curves made on deuteranopes. The significant points in these variations and the significance of determining the acromatic threshold in congenital dyschromatopsias are analysed. In spite of the presence of instructive details this report is offered as only a preliminary introduction to further investigation. (18 figures, 3 references)

Alice R. Deutsch.

## 5

## DIAGNOSIS AND THERAPY

Albuquerque de Souza, L. **The use of radioactive isotopes in ophthalmology.** Rev. brasil. oftal. 17:7-51, March, 1958.

The author, a physicist, gives a rather detailed summary of our knowledge of the constitution of atomic nuclei and the ways of obtaining isotopes. He reviews the devices used to measure radiation and the studies of the relation of radioactive substances to the blood-aqueous barrier. Radioactive isotopes are used in ophthalmology for diagnosis, treatment and research. He emphasizes the importance of $P^{32}$ for the diagnosis of intraocular tumors and reviews in detail the uses of alpha, beta and gamma radiation. (15 figures, 222 references) Walter Mayer.

Amaral Filho, A., Tupinamba, J., Malta, A. S. and Lemos da Silva, J. L. **Symposium: Antibiotics in ophthalmology.** Arq. brasil. de oftal. **20**:303-372, 1957.

Amaral Filho, Arthur. **History and classification.** pp. 303-312.

For practical purposes the history of antibiotics began with Fleming's discovery of penicillin, although Pasteur and Joubert noted that certain organisms could inhibit the development of anthrax, and suggested the possible therapeutic significance of this observation in 1877. Also, Emmerich and Loew isolated pyocianase from Ps. pyoscyaneus in 1899. The spectacular success of penicillin gave impetus to additional research in the field of antibiotics until today when there are available a variety with activity ranging from a limited spectrum to those which may be effective against numerous bacteria, spirochetes and viruses. (15 references)

Tupinamba, Jacques. **Pharmacology of the antibiotics.** pp. 313-320.

Antibiotics are substances, chemical in nature, produced by microorganisms (bacteria, fungi or actinomyces) which selectively impede the multiplication of certain microorganisms. The range of activity varies considerably, hence we have those with a narrow spectrum of action and those with a broad spectrum. The mode of action is not perfectly understood, but the most characteristic property of an antibiotic is its ability to inhibit the metabolic functions vital to a bacterial cell. A short discussion of several specific antibiotics is presented, with special reference to their application in the field of ophthalmology.

Malta, Antonio S. **Therapy with antibiotics.** pp. 321-337.

Antibiotics are administered systemically and locally. Local administration in ophthalmic practice consists of the extrabulbar use of ointments and drops, subconjunctival injections, application in powder form, saturated tampons and ocular baths. In addition, the antibiotic may be injected directly into the globe, behind the globe or lateral to it. The antibacterial spectra of the most commonly used antibiotics are discussed, with their mode of action. It is emphasized that they are bacteriostatic, inhibiting cellular division, and that they are bactericidal only in very high doses. This bacteriostatic activity results from interference with the metabolism of the microorganisms in which they are deprived of necessary amino acids. (11 references)

Lemos da Silva, José Luiz. **Resistance to antibiotics—secondary and toxic reactions—incompatibility.** pp. 338-372.

Antibiotics are administered so frequently and in such large doses that in the year of 1953 over 372 tons of penicillin alone were used in the United States, with a proportionate quantity of other well-known antibiotics. This enormous quantity can be compared only with a similar large volume of vitamins which are consumed. The phenomena of drug sensitization and resistance are being observed with increasing frequency, particularly when used parenterally. Reactions from penicillin seem to be most severe. The indiscriminate administration of these potent agents can be hazardous. A word of caution is sounded against the routine use in every infectious state regardless of cause, as well as the prophylactic use preoperatively and postoperatively. One additional point is emphasized—the danger of masking the diagnosis by the use of antibiotics and the development of superinfections. In general, antibiotics are incompatible with alkalies and their salts, metallic salts, permanganates, chromates and oxidizing agents. Contact with air (oxygen) modifies or diminishes their specific action. The author describes specific accidents attributed to therapy

with individual antibiotics. These may be local or general in nature, allergic, toxic or merely intolerance. (182 references)
James W. Brennan.

Arjona Trapote, J. **Non-congenital benign epibulbar tumors.** Arch. Soc. oftal. hispano-am. **18**:103-107, Feb., 1958.

The author urges that before making the diagnosis of a malignancy at the limbus, and advising enucleation, the neoplasm should be thoroughly removed and examined histologically. He reports two cases which clinically appeared malignant, but on biopsy proved to be benign. One occurred in a man, 30 years old, who in addition to a pterygium of the right eye had a sessile, richly vascularized neoplasm of the limbus suggestive of an epithelioma. The histologic section demonstrated its purely papillomatous character. The second case in a child, six years old, of a reddish neoplasm of the right limbus in its supero-internal portion also suggested malignancy. The microscopic section of the excised tumor revealed a foreign body granuloma with large multinuclear giant cells, epithelioid cells and plasma cells. (3 figures) Ray K. Daily.

Baumgarten, G. **Digitalis treatment in ophthalmology.** Klin. Monatsbl. f. Augenh. **132**:411-413, 1958.

The eye drops which contain digitalis as a tonic seem to reach a concentration of the drug which is higher for the ciliary muscle per gm. weight of muscle than the amount of digitalis used in cardiac therapy for the heart muscle. (10 references)
Frederick C. Blodi.

Bonaccorsi, Antonio. **The index of Fritz in arterial hypertension.** Rassegna ital. d'ottal. **26**:327-332, Sept.-Oct., 1957.

The author measured the index of Fritz (compression of the globe to determine the points of loss and return of retinal pulsation) in 30 subjects with general hypertension of whom eight had renal disease, 15 essential hypertension, and seven arteriosclerosis. The index of Fritz was constantly increased in arteriosclerosis or renal damage. In eight of the patients with essential hypertension there was an increase in the elasticity of the retinal arteries (EAR) and in seven there was no difference in the index. The author advances the hypothesis that EAR in arterial hypertension may represent the first sign of alteration of retinal walls. (1 table, 19 references) Eugene M. Blake.

Bosomworth, P. P., Ziegler, C. H. and Jacoby, J. **The oculo-cardiac reflex in eye muscle surgery.** Anesthesiology **19**:7-10, Jan.-Feb., 1958.

The authors advise continuous monitoring of the cardiac rate and rhythm during surgery of the extraocular muscles. This disturbance was noted in 23 of 28 patients. (1 table, 6 references)
Irwin E. Gaynon.

Bregeat, P. and Boujard, O. **Radioactive "in situ" treatment of pituitary tumors by the stereotaxic nasal route. Ophthalmologic results.** Bull. et mém. Soc. franç. d'opht. **70**:1-12, 1957.

In view of the many hazards in the surgery of pituitary tumors, this comparatively new technique of irradiation should be a welcome and useful addition to standard therapeutic procedures. Detailed encephalography and angiography always should precede the irradiation. The radioactive substance must be introduced in general anesthesia in combination with local nasal anesthesia. Whereas 40 to 50 mc. of radio-active gold may destroy a chromophobic or eosinophilic adenoma, 60 to 70 mc. are needed to destroy a normal pituitary gland. Radioactive gold emits beta rays in a sphere of action of 5 to 6 mm. The half-life time is about 50

hours. The results of stereotaxic irradiation in chromophobic and acidophilic tumor restricted to the sella were excellent. More doubtful were the results in giant-cell adenomas. In the latter cases a high implantation of irradiated gold was advised, because of the tendency of the giant-cell tumor to recur, to extend beyond the region of the sella and to invade the third ventricle. Pathologic changes of the chiasm were found concomitant with various stages of pituitary destruction. Sometimes however the visual pathways were not affected. No displacement of the gold capsule was seen in spite of progressive disappearance of glandular tissue. Serious metabolic results were avoided as long as the pituitary stalk and its base were preserved. Late biologic effects of gamma rays in stereotaxic irradiation are undoubtedly possible; nevertheless this treatment is justified not only in tumors of the pituitary but also in remedial destruction of the pituitary in the course of widespread cancer metastasis, diabetes and malignant exophthalmos. (5 figures)

Alice R. Deutsch.

Chamlin, Max. **Visual field changes by X-ray treatment of pituitary tumors.** Brit. J. Ophth. **42**:193-211, April, 1958.

Although the number of cases studied is not large, the results show the value of the Chamlin method of field testing in this type of case. The 2/330 white peripheral field may be normal when the 1/2000 white field may show bitemporal hemianopsia. The 1/2000 central field often reveals evidence of a chiasmal lesion much earlier than the peripheral field defects. By using these two, and particularly the central field tests, one can follow the course of the disease and regulate radiation therapy. The 40 patients followed in this survey revealed that improvement in both vision and fields can occur within four to 18 months after cessation of therapy and total improvement cannot be estimated in some instances until three years after therapy. (9 figures, 3 tables, 6 references)

Lawrence L. Garner.

Dinsdale, Howard. **Use of primacaine hydrochloride in intraocular ophthalmic surgery; clinical evaluation.** Minnesota Med. **41**:102-103, Feb., 1958.

This relatively new anesthetic is 2′-diethylaminoethyl-2-butoxy-3-aminobenzyate hydrochloride. It was found to be a superior anesthetic agent for intraocular surgery in a series of consecutive, unselected patients aged 29 to 81 years. Among the operations performed, 80 were for cataract, 10 for glaucoma, and two for foreign body in the anterior chamber. (4 figures, 2 references)

Irwin E. Gaynon.

Druault-Toufesco. **Clinical and prognostic evaluation of provoked dazzling.** Bull. et mém. Soc. franç. d'opht. **70**:194-205, 1957.

Provoked dazzling as a performance-test (photoplexie) is only rarely used in the United States. In Europe this test has received considerable attention and has been considered reliable for a functional study of the central retina. The adaptometer of Goldman-Weekers allows an exact graphic registration of the retinal functions after dazzling. Bailliart's method is much less complicated, efficient enough for routine use, and only uses simple equipment. The carefully adjusted light of an ophthalmoscope is focused on the macula for a given time. The appearance and disappearance of the after image and the return of the normal visual acuity are charted and evaluated. Type I is considered to be normal and asks for a return of the usual visual acuity in about 50 seconds. The normal test is called positive. The pathologic variety is called negative. There are three abnormal types, type IV being the worst without any change in visual acuity. This latter phenomenon has

been observed before the appearance of a retinal detachment, not only in the diseased eye but also in the fellow eye. It has been interpreted as a metabolic disturbance, as a functional break between pigment epithelium and the rod-and-cone layer, preceding the anatomic separation which is a detachment of the retina. A negative test has also been found in myopia just before the development of paracentral and central scotomas accompanying chorioretinal central lesions.

Seven myopic patients with retinal detachment were studied. Attention is called to the frequent absence of the scotoma of dazzling in the fellow eye of a retinal detachment. The potential importance of these investigations for the clinical prognosis of retinal and choroidal disease was reconfirmed. (2 figures)

Alice R. Deutsch.

Emmrich, K. **Anterior chamber lenses of silicate glass.** Klin. Monatsbl. f. Augenh. **132**:254-256, 1958.

This new type of lens was used in 30 patients. The results compared favorably with a previous series of 108 lenses made of plastic. The glass is produced by C. Zeiss and is also used for contact lenses. It can be better sterilized and it causes less reaction than plastic. (18 references)

Frederick C. Blodi.

Hellmuth, Evamaria. **Lacrimal dilator and canula in one instrument.** Klin. Monatsbl. f. Augenh. **132**:409-410, 1958.

The lacrimal dilator No. 2 is hollow and through it the irrigation can be performed.

Frederick C. Blodi.

Hollenhorst, Robert W. **The diagnostic value of various ocular symptoms.** J. Lancet **78**:11-14, Jan., 1958.

The author discusses the significance of ocular symptoms for the physician who is not an ophthalmologist. He has chosen to elucidate chiefly those symptoms which are the result of a disturbance of the structures or functions of the eye itself and very few that lead to the recognition of a disturbance elsewhere; oscillopsia is an example of this class.

F. H. Haessler.

Hruby, K. **Slitlamp examination of the posterior segment of the eye.** Klin. Monatsbl. f. Augenh. **132**:244-245, 1958.

In order to be able to vary the position of the concave lens, an attachment was designed by which the lens can be moved with a knurled knob. It is usually of advantage to have the lens as close to the patient's eye as possible. (1 figure, 4 references)

Frederick C. Blodi.

Koke, M. P. **Akinesia of the orbicularis oculi.** Tr. Pacific Coast Oto-Ophth. Soc. **38**:125-130, 1957.

The author summarizes briefly the various procedures used to paralyze the facial nerve in ophthalmic surgery. The two preferred methods are those of Van Lint and O'Brien; the author prefers the latter. He proposes injecting the solution slightly below the original O'Brien site, below and anterior to the tragus and he also advocates using 7 cc. or more of anesthetic solution. (7 references)

Walter Mayer.

Lembeck, Günther. **Neural therapy in ophthalmology reinforced by vitamin $B_{12}$.** Klin. Monatsbl. f. Augenh. **132**:404-407, 1958.

A combination of procaine, nicotinic acid and vitamin $B_{12}$ was used in 22 patients with various ailments. The improvement was sometimes surprising and long lasting. (1 table, 9 references)

Frederick C. Blodi.

Moore, Gibson J. **A simple diathermy machine.** Brit. J. Ophth. **42**:245-247, April, 1958.

Brief but explicit directions are given

for the building of a valve type diathermy machine. The superiority of the valve machine over the spark gap variety may be questioned; they give equally good coagulation. (2 figures)

Lawrence L. Garner.

Paiva, C. and Zaverucka, A. **Recent developments in therapy with corticosteroids.** Arq. brasil. de oftal. 20:373-382, 1957.

This article gives a brief summary of the actions and uses of the corticosteroids and a schematic illustration of the relationship of the anterior pituitary and the adrenal cortex. (10 references)

James W. Brennan.

Palomar Collado, F. and Palomar Petit, F. **The superimposed binocular normal and pathologic visual fields.** Arch. Soc. oftal. hispano-am. 18:147-166, Feb., 1958.

Ten perimetric fields, taken monocularly and binocularly, illustrate the effect of superimposition of the visual fields in normal eyes and in cases of retinitis pigmentosa, absolute glaucoma, pituitary tumor, hydrocephalus caused by obstruction of the aqueduct of Sylvius, left temporooccipital arteriovenous aneurysm, cerebral thrombosis and an arteriovenous aneurysm of the left occipital lobe. (12 figures, 6 references) Ray K. Daily.

Pascual Marti, Jose. **A contribution to the making of ocular prosthesis, and to the prosthetic correction of abnormal orbital cavities.** Arch. Soc. oftal. hispano-am. 18: 73-82, Jan., 1958.

The author, who lost his own eye and could not obtain a satisfactory esthetic ocular prosthesis, became interested in this field and developed a method of making satisfactory individual prostheses from orbital molds. The method of taking the molds and making the prosthesis is described and the results illustrated. On the basis of an experience with 182 cases he concludes that the advantage of a prosthesis made from a mold of the orbital cavity consists in accurate approximation of the orbital tissue to the prosthesis with elimination of the secretion and discomfort caused by poor approximation and in securing better ocular motility. Shrunken or congenitally deformed orbital cavities are treated by the insertion of prostheses gradually increasing their size as the orbit stretches. He reports the case of a 19-year-old boy whose eye became atrophic in infancy after ophthalmia. He has never worn a prosthesis and his orbit could not hold one. In the course of three months his orbital cavity stretched so that he could hold a prosthesis, and the cosmetic improvement was marked. Another case was that of an infant who was born with a left anophthalmic socket and whose treatment was begun when it was 11 days old; the result was a satisfactory prosthesis and a normal development of the anophthalmic socket. Another difficult case was that of an infant with a right microphthalmia, small palpebral fissure and deformed socket. Within two months of treatment the size of the palpebral fissure was definitely increased. (16 figures)

Ray K. Daily.

Roper, Kenneth L. **Evaluation and management of minor contusions of the eye.** Minnesota Med. 40:761-765, Nov., 1957.

Contusions occur when the impact has been of sufficient force to have caused internal lacerations, at the same time leaving the surface layers of the eye intact. This may result in tears of the conjunctiva, cornea, iris and ciliary body, lens, choroid, retina, and sclera. There may also be vitreous opacities or hemorrhages, post-traumatic hypermetropia or myopia, and changes in the ocular tension. "For medicolegal reasons, the importance of a

concise but detailed history and the recording of all pertinent findings and observations is stressed."

Irwin E. Gaynon.

Rossitto, R. M. **Clinical contribution to the therapy of some ocular affections treated with prednisone.** Arch. di ottal. **61**:367-378, Sept.-Oct., 1957.

The author first listed the advantages of prednisone over cortisone when used internally. Then he reviewed the results of treatment of 120 patients with 0.25 or 0.50 percent prednisone ointment used in the eye four times a day. Some of the patients with primary conjunctivitis who did not respond fully to cortisone or hydrocortisone did respond to prednisone. Five patients with trachomatous pannus improved, but three required 40 days of treatment. (13 references)

Paul W. Miles.

Schirmer, R. **A new instrument for subconjunctival implantation.** Klin. Monatsbl. f. Augenh. **132**:407-408, 1958.

The instrument works like a trocar. The placental tissue can be easily transplanted. (2 figures) Frederick C. Blodi.

Schober, Herbert. **A hand optometer for clinical use.** Klin. Monatsbl. f. Augenh. **132**:246-248, 1958.

This handy instrument is produced by Rodenstock in Munich and serves for bedside refractions. The refraction is determined by changing the distance of the target. An astigmatic dial and optotypes are used. (2 figures) Frederick C. Blodi.

Smith, J. V. **New technique in campimetry.** Brit. J. Ophth. **42**:251-254, April, 1958.

The author describes a new method of campimetry in which the stimulus is an electric light which is made to appear at intervals through apertures of various size in a revolving disc. Its advantages are the absence of a moving holder and uniform size and color of the stimulus. The light can be extinguished by means of a push-button switch held in one hand when the patient tries to check his responses by looking at the target. (3 figures) Lawrence L. Garner.

Valentin-Gamazo, D. Ignacio. **Iodine and its compounds in ocular therapeutics.** Arch. Soc. oftal. hispano-am. **17**:1398-1417, Dec., 1957.

The author advocates the wide use of iodine and its compounds in ocular diseases and regards a combination of iodine and arsenic as particularly beneficial in all ocular diseases in which a general stimulating effect and an increased metabolism with elimination of waste products is desirable. The physical, chemical and pharmocologic properties of iodine are described, and the literature on the therapeutic application is reviewed. (15 references) Ray K. Daily.

Van Allen, M. W., Blodi, F. C. and Brintnall, E. S. **Retinal artery blood pressure measurements in diagnosis and surgery of spontaneous carotid occlusions.** J. Neurosurg. **15**:19-29, Jan., 1958.

An approximation of retinal artery blood pressure can be made by the technique of ophthalmodynamometry. The measurements so obtained directly reflect the pressure in the internal carotid artery and are of definite value in comparing the pressures in these arteries on the two sides.

Comparative studies of retinal artery pressure in three cases of proved occlusion of the internal carotid artery revealed that pressures on the side of occlusion were lower than those on the contralateral side by 30 to 40 percent in systolic and 25 to 54 percent in diastolic readings. Two of the three patients were sub-

jected to surgery without preliminary angiography and in these the measurements of retinal artery pressure proved to have given substantial and valid support to the clinical diagnosis. (1 figure, 1 table, 29 references)

Authors' summary.

Weekers, R. and Bonnet-De Rudder, M. **Gonioscopy with the surgical microscope of Zeiss.** Klin. Monatsbl. f. Augenh. 132:242-244, 1958.

A gonioscopic examination is done with the microscope and the contact lens of Goldmann. The patient is lying down and an optical section can not be obtained. The method is useful during operations, for children, under general anesthesia, and in other circumstances. (1 figure, 3 references) Frederick C. Blodi.

Wilson, Peter. **Removal of corneoscleral sutures.** Brit. J. Ophth. 42:248-250, April, 1958.

The author retracts the lid with the fourth finger of his left hand and uses thumb and index finger to hold the forceps. He cuts the suture with a short, rounded blade held parallel to the surface of the cornea, with the cutting edge directed to the 12-o'clock position. Non-toothed forceps should be used to avoid injury should the patient look up. (1 figure, 8 references) Lawrence L. Garner.

## 6

## OCULAR MOTILITY

Bond, F. M. **Surgical experience and orthoptics in esotropia.** Tr. Pacific Coast Oto-Ophth. Soc. 38:131-143, 1957.

In this statistical study the results of muscle operations combined with orthoptics are classified. Of 219 patients 38 were cured, 49 were improved, 94 had good cosmetic results and residual deviations were found in 20 patients. This last group is made up of undercorrections as well as overcorrections. The author feels that orthoptics alone will seldom produce a cure but is a valuable factor in diagnosis and treatment.

Combined operations give better results than operations on a single muscle. A patient with a squint of short duration needs less surgery than one with a long standing squint. The younger the child, the more effective surgery will be and a second operation will correct more than a first operation, so that overcorrection is more apt to occur. If fusion is present the results are usually better than when it is absent. Walter Mayer.

von Burstin, Dorothea. **Exotropia with anomalous correspondence in one identical twin.** Klin. Monatsbl. f. Augenh. 132:197-201, 1958.

Only one of these five-year-old boys had an exotropia of eight degrees. The refractive error was identical in both boys. Pleioptic and orthoptic treatment were successfully employed. (1 figure, 12 references) Frederick C. Blodi.

Huber, A. **Myasthenia (Erb-Goldflam's disease) and paralysis of ocular muscles.** Bull. et mém. Soc. franç d'opht. 70:216-232, 1957.

Electromyography has proved to be an important additional test in the early diagnosis of ocular myasthenia. Specially constructed needle electrodes are inserted into the individual ocular muscle without any pain. The myogram characterized by short potentials, by small, often polyphasic amplitudes and by complete block, succeeding repeated stimulation of the muscle, is immediately changed to normal following the intravenous injection of 10 mg. Tensilon. Tensilon is more effective than prostigmine for diagnostic purposes because of its immediate action. It has no therapeutic value because of the short

duration of this action. The myogram in Graves' disease often resembles the myogram of myasthenia. This is not surprising as the histologic pictures are nearly identical. Muscular atrophy, increase of the cells of the sarcolema and lymphocytic infiltration were found in both diseases. As soon as the diagnosis of myasthenia gravis has been made, prostigmine or pyridostigmine should be given. An adequate evaluation of the necessary dosage is essential. In the presence of an enlarged thymus, irradiation of the thymus or thymectomy has been successful in selected cases. Occasionally the paralysis of one or more muscles becomes permanent, as revealed by myogram. In these cases surgery should be performed to re-establish the muscular equilibrium. Pre- and postsurgical pictures and coordinometer charts are included to demonstrate the improvement brought about by surgery. (13 figures, 19 references)

Alice R. Deutsch.

Kirschbaum, W. R. and Holland, J. J. **Progressive dystrophy of the external eye muscles.** Neurology 8:304-306, April, 1958.

The authors describe a 35-year-old man in whom bilateral ptosis became manifest in his early teens. Gradually complete external ophthalmoplegia developed. A nuclear amyotrophy was excluded by the observation of normal motor end plates in the degenerated fibers of the extraocular muscles. (2 figures, 18 references)

F. H. Haessler.

Kittel, V. **The mechanism of focussing for near in healthy and vegetative dystonic eyes.** Klin. Monatsbl. f. Augenh. 132:180-189, 1958.

Two types of heterophorometer were used. One was the Bielschowsky model which is a stereoscope with a red, vertical prism in one eye. A green arrow points toward red squares. The other model is produced by Oculus. A red Maddox cylinder and a green glass are put in front of the eyes. The patient looks at a fixed red and at a movable green point.

In normal persons the results obtained with these two instruments are practically identical. In patients with nervous asthenopia there is often a difference in the results obtained with the two methods. In these patients the convergence is often higher with the Oculus model. Similar results were found in normal patients after the local administration of homatropine or pilocarpine. (2 figures, 22 references)

Frederick C. Blodi.

Lavat, Jean. **Technical details in the orthoptic and surgical treatment of strabismus.** Bull. et mém. Soc. franç. d'opht. 70:25-49, 1957.

Some modifications of the regular orthoptic training methods are presented. These procedures have been used for about one year, preferably in patients with anomalous correspondence and only if bilateral central fixation was present. Very small macular targets were used effectively for stimulation of the macula under the objective angle of squint on the synoptophore. The details and variations of these techniques are described and the results on the first series of 64 patients are summarized in tables. Especially interesting is the discussion on the use of the coordinometer and deviometer and a graphic presentation of the results. This graphic presentation replaced the six-branched star formerly used to chart ocular deviations with prisms. The graphic presentations make it very clear that the concomitance in the so-called concomitant squint is very often incomplete. It is suggested that some of the recent concepts concerning the surgical treatment of paralytic squints should be revised as needed for the surgery of the concomitant squint. The most important points of this modern

plan and the indications for particular procedures are explained and illustrated by three case histories. (14 figures)
Alice R. Deutsch.

Raphael, S. **Orthoptics and strabismus.** Rev. brasil. oftal. 17:85-89, March, 1958.

The author reviews briefly the beginnings of orthoptics, which were little effective and rather prolonged and compares the results with the newer orthoptic treatment of Bangerter, who feels that the main purpose of orthoptics is to stimulate the macula and perimacular area of amblyopic eyes, using strong sources of light. With this treatment spectacular results can sometimes be obtained in a rather short time, and even though the optimal time for treatment is between six and 12 years of age, sometimes good results can be obtained in much older patients. (6 references) Walter Mayer.

Silvan, Fernando. **Surgical indications for horizontal strabismus with a vertical component.** Arch. Soc. oftal. hispano-am. 17:1382-1397, Dec., 1957.

Detailed indications are given for surgery in concomitant strabismus, in strabismus associated with overaction of the inferior oblique without paretic muscles, in strabismus of paretic origin, and in spastic strabismus and in special cases. It is believed that attention to the vertical deviation is essential to the cure of the strabismus, and diagnostic efforts are rewarded by therapeutic results. To establish surgical indications in each individual case, diagnostic acumen and careful study are required. Since theoretical expectations are superior to the practical results and only about 35 percent of patients acquire binocular vision, strabismus still presents a wide field for further investigation. (11 references) Ray K. Daily.

Thiébault, M. F., Matavuly, N. and Metzger, O. **Three cases of nystagmus retractorius.** Bull. et mém. Soc. franç. d'opht. 70:50-62, 1957.

Nystagmus retractorius (clonus retractorius) is a rare but significant phenomenon. It manifests itself by a rhythmic retraction of the globes of various intensities, sometimes very striking and visible on casual examination, sometimes so minute that only careful and prolonged observation would reveal it. Abnormal ocular rotations, a fixed esotropia or a monocular pronounced adduction are accompanying signs. Parinaud's syndrome in the form of impaired conjugate elevation has been seen almost in every case. Lid retraction however is present only occasionally. In spite of the fact that explanations of the mechanism of this syndrome are unsatisfactory it is a most valuable aid for localization of intracranial lesions. It directs attention precisely to the vicinity of the aqueduct of Sylvius, the region of the oculomotor nuclei and their pathways of association. The possible effect of the intracranial hypertension on the intensity of the nystagmus retractorius needs further investigation. Three case histories are reviewed; in each patient a tumor was found. The first two patients survived a surgical operation and recovered, carrying the Torkildsen tube which was inserted into the ventricular system during exploratory surgery. (4 figures, 21 references) Alice R. Deutsch.

## 7

## CONJUNCTIVA, CORNEA, SCLERA

Broschmann, Dieter. **Disturbances of corneal and conjunctival sensitivity in endocrine exophthalmos.** Klin. Monatsbl. f. Augenh. 132:311-322, 1958.

The examinations were done with Frey's hairs. Forty patients with varying degrees of exophthalmus were tested and only six of them had normal corneal and conjunctival sensitivity. On the other

hand there was no patient with complete anesthesia. There was no correlation of the degree of hypesthesia with the severity or the duration of the exophthalmus. It is therefore unlikely that decreased sensitivity (or the degree of exophthalmus) is the major cause for the corneal lesions and ulcers. (1 figure, 10 tables, 17 references) Frederick C. Blodi.

Christensen, Leonard. **Cornea and sclera.** A.M.A. Arch. Ophth. **59**:280-301, Feb., 1958.

This is the annual review of the literature on sclera and cornea. (185 references) G. S. Tyner.

Cornet, Emmanuel. **Clinical classification of trachoma.** Rev. int. du trachome **34**:190-205, 1957.

The classification suggested emphasizes the conjunctival signs as well as the corneal changes, mainly the pannus. The author draws attention to his previous classifications, the complete one published in 1934, and the simplified one in 1937. Their importance is underlined especially when no biomicroscope is available. An alphabetical table shows the different conventional signs related to each lesion. (1 figure, 1 table) José A. Ferreira.

Cortes de los Reyes; Hernan. **Plastic surgery of symblepharon, using amniotic membrane.** Arch. Soc. oftal. hispano-am. **17**:1222-1226, Oct.-Nov., 1957.

A brief review of the literature is given and a report of a case of obliteration of the fornices, with dense corneal cicatrization following a chemical injury. Fresh amniotic membrane soaked in a weak solution of penicillin was used as the plastic material for restoration of the fornices, and a Castroviejo keratectomy was done on the cornea. The result was satisfactory ocular motility, with restoration of the fornices, and a superficially vascularized cornea with a visible pupil, and a visual acuity of counting fingers at one and one half meters. The result is regarded as esthetically satisfactory. Ray K. Daily.

Franceschetti, A., Chodos, J., Dieterle, P. and Forni, S. **Dystrophia filiformis cornea profunda.** Bull. et mém. Soc. franç. d'opht. **70**:175-179, 1957.

Corneal degenerations in the deepest part of the parenchyma, immediately in front of Descemet's membrane, are very rare indeed. They should, however, be differentiated from degenerative changes of Descemet's membrane which are not as rare and mostly are identified as keropathia guttata and posterior polymorphus keratopathy. Maeder and Denis described a corneal degeneration in the deepest layers of the cornea in a 42-year-old woman with keratoconus. This degeneration consisted of numerous punctiform and filiform grayish opacities in the central and paracentral region, immediately in front of Descemet's membrane. Descemet's membrane and the endothelium were normal. The pattern of the corneal nerves was greatly accentuated. A more or less identical corneal abnormality has been observed by the authors in a 38-year-old highly myopic woman. Corneal changes, similar in location but slightly dissimilar in morphology, have been described in cases of congenital ichthyosis alone and in connection with a bandshaped keratopathy. Systematic corneal investigations in patients with skin diseases might prove to be of great interest to both the dermatologist and ophthalmologist. (2 figures, 13 references) Alice R. Deutsch.

Fukushima, S. **Pathology of trachoma as revealed by electron microscopy in thin sections.** Acta Soc. Ophth. Japan **61**:2309-2330, Nov., 1957.

Fukushima states that the most characteristic changes by trachoma are found in the epithelial layer. The virus inclu-

sions are found in the epithelial layer exclusively and are never found in the subepithelium. Within 24 hours after the onset of trachoma, leucocytes invade the epithelial layer, destroying the connection of the cells and forming "tunnels" in the intercellular space. Mitochondria of epithelial cells become swollen and the cristae are disturbed. Epithelial cells at the superficial layer are apt to be discharged with mucous cells, owing to the developed tunnels beneath the layer. (25 figures, 7 references) Yukihiko Mitsui.

Galli, L. **Endemic keratoconjunctivitis produced by an insect in the neighborhood of Szeged.** Szemeszet **94**:107-111, 1957.

In the environment of Szeged severe inflammation of the eye caused by the impact of an insect upon the bulb occurred in several cases. The disease was unilateral and the insect did not bite, symptoms appeared after an incubation time of six to 12 hours; edema developed and occasionally oozing and crust formation on the lids. There was chemosis and hyperemia of the conjunctiva. Considerable and lasting decrease of corneal sensitivity developed with corneal edema and defects in the epithelium. There were neutrophilic leucocytes in the conjunctival discharge but cultures were negative. The poison of the insect produces a lasting anesthesia and increase of permeability. None of the insects could be captured. Published data suggest that Paederus holyva may be the cause of the disease, but the reduction of corneal sensitivity has not been mentioned by Russian, Japanese, and Italian authors. Gyula Lugossy.

Gerber, Margaret. **Cogan's syndrome: a case report.** Northwestern Univ. Med. School Quart. Bull. **32**:15-17, Spring, 1958.

Cogan's syndrome consists of a patchy granular type of posterior interstitial keratitis, usually bilateral, and the severity varies from day to day. Corneal vascularization may occur late in the disease. This is accompanied by vestibuloauditory symptoms of sudden onset, severe vertigo, nausea, vomiting, nystagmus, and finally deafness with an improvement in the vestibular signs. (5 references)

Irwin E. Gaynon.

Irvine, A. R., Jr. **Malignant melanoma of the bulbar conjunctiva.** Tr. Pacific Coast Oto-Ophthal. Soc. **38**:115-124, 1957.

The author describes a patient who had an anaplastic malignant melanoma removed from under the bulbar conjunctiva and in 13 years six similar tumors were removed before an exenteration of the orbit was performed. The author feels that the different tumors were from multiple foci of origin, rather than an extension from the original tumor. The first recurrence occurred five years after the original surgery. Despite the fact that histologically the tumor was very malignant, a more conservative treatment than exenteration seems to be indicated. (7 figures) Walter Mayer.

Kony, Maria. **Three-years' treatment of trachoma.** Rev. int. du trachome **34**:213-229, 1957.

Studies were done in Morocco concerning the treatment of the adult population as well as school children, with a three-year period of follow-up examinations. One-percent ointment of aureomycin three times a day was used; 55 percent cures and improvements in 30 percent of the adult population were obtained and similar results in the school children. Medical treatment added to high caloric diet, vitamines, and sunny rooms are of paramount importance. (2 figures)

José A. Ferreira.

Labady, A. and Sztrilich, L. **Hematologic examinations in trachoma patients.**

Klin. Monatsbl. f. Augenh. **132**:233-241, 1958.

The authors examined 130 patients with acute trachoma. The white blood-cell count, sedimentation rate, and distribution of blood groups were within normal limits. There was a moderate lymphocytosis in many patients. (1 table, 17 references, 14 references)

Frederick C. Blodi.

Mims, J. L., Jr. **Decreased vision from pterygium and suggestions for treatment.** Texas St. J. Med. **54**:21-24, Jan., 1958.

In slitlamp examination, the caput of the active pterygium is found to be covered by corneal epithelium. An active pterygium has a thick, almost translucent cap with pseudopodia, and small gray dots near their advancing edge. As vascular tissue invades the cornea, corneal epithelium is replaced by conjunctival type tissue. Treatment consists of lamellar resection of the cornea, combined with the bare sclera technique and followed by beta irradiation with a strontium-90 applicator. (2 figures, 1 table, 5 references)

Irvin E. Gaynon.

Mueller-Eckhard, H. **Psychogenic conjunctivitis.** Acta Psychotherap. **6**:29-42, 1958.

A conjunctival inflammation of six weeks' duration in a 19-year-old girl is interpreted as an expression of a state of existential anxiety and failure to cope with sexual reality. F. H. Haessler.

Nakamura, Yasushi. **The pathology of trachoma in Japan.** Rev. int. du trachome **34**:93-189, 1957.

A detailed explanation of the histologic changes in the different stages of trachoma and short descriptions of the clinical aspects are given. The author divides them, according to the tissue involved, into trachoma of the conjunctiva, cornea, and of the lacrymal gland. The significance of the adenoidal tissue is emphasized. Van Gieson and Bielchowski's stains were used; some special stains such as alpha naphthol solution and the preoxydase reaction were also used. For treatment of large groups of population 1-percent ointments of aureomycin and terramycin gave very good results in the beginning. But apparently the organism became resistant in spite of using stronger concentrations. Statistics show that the incidence of the disease has decreased from 24 percent in 1919 to 5 percent now. (83 figures, 16 tables)

José A. Ferreira.

Nemetz, U. R. **Biologic study of viable corneal tissue and its relationship to keratoplasty.** Arch. f. Ophth. **159**:609-635, 1958.

The preservation of corneal tissue in paraffin oil extends the possibility of keratoplasty. The basophilia of the stored cornea begins to decrease noticeably after the tenth day as does also the ability of the cornea to swell. Morphologic and histochemical changes become conspicuous after the tenth day. The epithelium and endothelium are almost always lost at this time, the nuclei of the stromal cells are shrunken and the parenchyma stains less intensively with PAS and Alcian blue. Specific group substances which are demonstrable in water-soluble form in the fresh cornea disappear after 14 days in paraffin oil. (17 figures, 4 tables, 77 references) F. H. Haessler.

Otto, J. and Hild, E. **Keloid and cholesterol granuloma of the cornea.** Klin. Monatsbl. f. Augenh. **132**:322-328, 1958.

Two cases of corneal keloid are reported. In one patient it followed a perforating injury; in the other it was bilateral and followed cataract extractions. The keloids could be peeled off quite

easily. The cholesterol granuloma developed many years after a chemical injury to the cornea. It also could be removed. (9 figures, 1 reference)

Frederick C. Blodi.

Pau, Hans. **What is the origin of the leucocytes of the injured cornea?** Arch. f. Ophth. 159:540-559, 1958.

It is undecided whether during inflammation leucocytes originate from the affected tissue cells or are derived from the blood leucocytes. In the present study the author used rabbits and produced central inflammation in their avascular corneas. He came to the following conclusions. During the first two hours none of the numerous leucocytes seem to have immigrated from the limbus. Various controls show the spontaneous development of leucocytes in the corneal center. The nuclei of the parenchymatous cells seem to be transformed into leucocytes. This transformation is especially seen along the margins of a central corneal wound. In loco development of leucocytes can also be observed after a local injection of heterologous serum. Production of a corneal burn transformed epithelial cells into leucocytes. The experiments make it probable that the leucocytes found in central keratitis in man mostly develop "in loco". (4 figures, 32 references)

Ernst Schmerl.

Paycha, F. **Corneal diseases, instructions on pathology and therapeutics, information on research.** Bull. et mém. Soc. franç. d'opht. 70:154-174, 1957.

A system of principles and rules towards a new type of clinical diagnosis and investigation is presented. The methods and ideology refer to R. V. L. Hartley and his systematization of information, symptomatology, binary symbolism and response. The course of investigation was demonstrated in the evaluation of corneal diseases. It will be interesting to note how far human judgment and reasoning can be replaced by mechanical calculation, whether a medical robot can ever surpass attentive expert analysis.

Alice R. Deutsch.

Pickrell, K., Georgiade, N., Kepes, J. and Woolf, R. **Tattooing the cornea.** Am. J. Surg. 95:246-254, Feb., 1958.

A method of permanent pigment injection into corneal scars is described. This has been used without complications in over 100 patients during the past ten years. The opacities were congenital or post-traumatic, or the sequellae of post-operative conjunctival flaps, iris coloboma, polychromia and heterochromia.

Tattooing may improve visual acuity by reducing the area of abnormal cornea which disperses pencils of light. The tattooed area absorbs light and the clear area acts as a pin hole. (7 figures, 20 references)

Irwin E. Gaynon.

Postic, S. **The keratitis of chicken pox.** Bull. et mém. Soc. franç. d'opht. 70:127-137, 1957.

Corneal diseases caused by the virus of chicken pox are comparatively rare. A dense, localized interstitial corneal infiltration with a shallow central ulceration was seen in a 10-year-old girl, simultaneously with a general skin rash. Inoculation of a rabbit cornea with the debris from the corneal ulcer was negative, confirming Grueter's findings of a resistance of the rabbit cornea toward the chickenpox virus. The corneal lesion of the patient was refractory to local and systemic treatment. After six weeks a slow but continuous clearing could be observed. The final scar was delicate and scarcely visible. The difficulties of ascertaining the specificity of a local virus disease of any kind and the results of superimposed virus infections on conjunctival and corneal bacterial infections are discussed. Two cases of serpiginous ulcers of the cornea, not

reacting to chemotherapy and antibiotics and finally arrested by an added herpetic infection are reported for better illustration of these facts. The phenomena of mixed infections and the inter-relationship of viral toxins, proteolytic ferments, tissue necrosis and leucocytic invasion are described and some potential far-reaching bio-pathologic conclusions are suggested. It is the author's opinion that one of the main actions of antibiotics is inhibition of the virus toxins and restraining them from interfering with the normal body defenses on the intercellular level. (8 figures, 10 references) Alice R. Deutsch.

Refvem, Olav. **The Reiter syndrome in females.** Acta Rheum. Scandinav. **3**:282-288, 1958.

Reiter's syndrome has been known since 1916 and has only occasionally occurred in women. The author describes three women; one of them had the typical triad which consists of conjunctivitis, arthritis and urethritis. The other two patients had vaginitis instead of urethritis.

Irwin E. Gaynon.

Rycroft, B. W. **Three unusual corneal grafts.** Brit. J. Ophth. **41**:759-766, Dec., 1957.

Three unusual corneal graft operations are briefly described. In the first, a case of contralateral corneal autoplasty, the graft was removed from one eye of the patient and successfully transplanted to the other; the opaque button removed was transplanted into the fellow donor eye. Both grafts healed uneventfully. In the second case the graft used had been kept frozen at −79°C for four weeks. The graft healed well but remained cloudy for several months before it cleared. In the third case several synechiotomies had been done on a severely damaged eye prior to a lamellar graft which resulted in an appreciable improvement of vision. (10 figures, 7 references) Morris Kaplan.

Sedan, Jean. **Recurrent interstitial keratitis after cortisone treatment.** Bull. et mém. Soc. franç. d'opht. **70**:138-153, 1957.

The effect of local and systemic cortisone therapy on interstitial keratitis was evaluated on 146 patients from 1926 to 1950 and on 24 patients from 1950 to 1956. The enthusiasm of some workers for this type of treatment is critically compared with the defeatism of others. A very interesting statistical review of cases treated before and after the introduction of cortisone was made with special emphasis on the incidence of recurrences and on the final visual abilities of the diseased persons. In the 146 cases from 1926 to 1950, antiluetic drugs, especially bismuth, were used therapeutically; there were 12 recurrences (0.8 percent). In the 24 cases observed from 1950 to 1956 bismuth and cortisone were used in various forms; there were four recurrences and one repeated recurrence (16.6 percent). In spite of the small number of cases the larger number of recurrences was conspicuous. Just as evident however was the better visual acuity after cortisone therapy. The importance of adequate simultaneous antiluetic treatment is explained. The period of cortisone treatment should be prolonged and definitely extended over the active phase of the corneal disease; strict supervision should be continued for several months. (2 tables, 119 references)

Alice R. Deutsch.

Sommerville, R. G. **Epidemic keratoconjunctivitis—an adenovirus infection.** J. Hygiene **56**:101-107, March, 1958.

Two strains of adenovirus Type 3 were isolated from 59 patients suffering from epidemic keratoconjunctivitis. Serologic examination of a further group of 59 patients revealed that neutralizing antibody to adenovirus Type 8 usually developed when the duration of the disease exceeded 14 days, and that at the same time a smaller number of patients also

developed low titer neutralizing antibody to Type 3 adenovirus. From the evidence presented it is suggested that adenovirus Type 8 was the infecting organism in the majority of cases, and that when neutralizing antibody to Types 3, 6 or 7 adenovirus was present this probably represented a non-specific effect of stimulation by a heterotypic strain of adenovirus. Insignificant antibody titers by compliment fixation tests were frequently associated with high titers of neutralizing antibody in the late convalescent phase of the illness. (4 tables, 8 references)

Author's summary.

Stepanik, J. **Conjunctival lymph spaces periodically filled with blood.** Klin. Monatsbl. f. Augenh. **132**:99-103, 1958.

A 12-year-old girl had large lymph spaces of the conjunctiva and the lids on the left side. These became filled with blood whenever the girl slept but this no longer occurred after a lymph-hemagioma of the left parotid gland was extirpated. (8 figures, 5 references)

Frederick C. Blodi.

Szeghy, G. **Vascular phenomena on the conjunctiva in the course of experimental corneal injury.** Szemezt **94**:145-148, 1957.

The intravascular phenomena observed after a circumscribed lesion of the conjunctiva are in accordance with data in the literature. Circumscribed lesions of the cornea result in less active circulation in the conjunctival vessels, and intravascular aggregation (sludge) ensues in the vessels devoid of collaterals. The intensity of intravascular phenomena depends on the degree of the damage and its distance from the limbus. Deteriorated circulation in the vessels of the limbus is accompanied by circumscribed edema which can be rendered easily visible with Geigy blue. These vascular phenomena in the conjunctiva may be attributed to neural influences. Gyula Lugossy.

Tanaka, Chie. **A study of the relationship between adenovirus and epidemic keratoconjunctivitis.** A.M.A. Arch. Ophth. **59**:49-54, Jan., 1958.

Serums from 18 patients with typical or atypical epidemic keratoconjunctivitis were tested for serologic response to viruses of the adenovirus group. It was concluded that the data provided additional evidence of the causative role of type 8 and possibly type 7 adenovirus in epidemic keratoconjunctivitis. (1 table, 12 references) Edward J. Swets.

Toledo, C. **Vogt's white limbus girdle, type 2.** Rev. brasil. oftal. **17**:52-60, March, 1958.

The author presents three cases of the classical Vogt's white limbus girdle, type 2, which is situated more closely to the sclera than type 1 and which terminates on the corneal side by ramifications. (9 figures, 2 references) Walter Mayer.

Vancea, P., Lazarescu, D. and Vaighel, V. **Nummular keratitis.** Ann. d'ocul. **191**:149-165, Feb., 1958.

The authors report two cases of nummular keratitis occurring in young girls. Both were bilateral and had a history of recurrent conjunctivitis. Treatment was symptomatic except for the excision of the anterior lamellae of the cornea in each case. Microscopic examination showed an infiltration of the epithelium with round cells, and a replacement of Bowman's membrane by sclerosed conjunctival tissue containing numerous collagen cells. In one case a gram-negative coccobacillus was found. The authors feel that the herpes virus is not a factor in this disease of the cornea. (5 figures, 26 references)

David Shoch.

Wolter, J. R. and Landis, C. B. **Massive scleral granuloma.** Klin. Monatsbl. f. Augenh. **132**:59-70, 1958.

A 55-year-old man developed a tumor-

like elevation in the equatorial area of the left eye. Radioactive phosphorus uptake was markedly increased over this area. After enucleation a massive scleral granuloma (brawny scleritis) was found with remarkably little involvement of the other intraocular structures. Unusual was the painless course of the disease. The condition is an expression of rheumatoid arthritis. (10 figures, 21 references)

Frederick C. Blodi.

## 8

### UVEA, SYMPATHETIC DISEASE, AQUEOUS

Ambrosio, A. **The relation of inflammatory chorioretinitis and lens opacities.** Arch. di ottal. **61**:341-346, July-Aug., 1957.

The author noticed in a series of 20 patients with cataracta complicata and chorioretinitis, that seven of the lenses resembled those in high myopia. The posterior capsule became involved first, approximately a year after onset of the retinal disease. Cataract is a common complication of other ocular diseases such as retinitis pigmentosa, Fuchs's heterochromia and anterior uveitis. The posterior capsule seems most permeable to the cataractogenic substance arising in the retina. This substance might be a protein which after entering the capsule forms an opaque insoluble material. Paul W. Miles.

Bouzas, A. **Report on recurrent vitreous hemorrhages and recurrent uveitis with hypopyon (their possible relationship to each other).** Bull. et mém. Soc. franç. d'opht. **70**:180-193, 1957.

This report on the possible relationship of Eales' and Behçet's disease is based on the histories and findings of three patients who were studied in detail. The first two patients especially, presented the signs and symptoms of both diseases, while the third patient was more typical as a carrier of Behçet's disease with mild initial vitreous and retinal hemorrhages. Both diseases affect mostly young males; they are bilateral, recur periodically and show identical vascular lesions. The vascular lesions are predominently on the venous side and are characterized, pathologically, by infiltrations with lymphocytes, eosinophiles and plasma cells, either diffusely or localized in the vessel walls. Arteries are rarely involved. The inflammatory lesions, undoubtly, are not specific for tuberculosis. In Eales' disease the periphery of the retina is mostly the seat of the primary lesions, while in Behçet's disease the ora serrata and the ciliary body are the seat of origin. The general manifestations, namely, aphthous stomatitis, mucocutaneous lesions and arthritis, are more pronounced in Behçet's disease. The origin of both diseases is still unknown. Tuberculosis, focal infections, allergies, and viral infections have been considered as etiologic factors by various authors. Causal and symptomatic treatment has been equally unsatisfactory in both diseases. Periphlebitis retinalis is seen in many ocular and in several systemic diseases, therefore the differential diagnosis often is difficult. (1 table, 42 references)

Alice R. Deutsch.

Casanovas, J. and Arumi, J. **Metastatic carcinoma of the choroid.** Arch. Soc. oftal. hispano-am. **18**:108-117, Feb., 1958.

Two cases of metastatic carcinoma of the choroid are reported. The first patient developed loss of vision, pain and increased ocular tension in the left eye four years after the radical removal of a cancer of the breast. Because of the pain the eye was enucleated. The histologic section of eye revealed a large tumor with invasion of the episclera through the emissaries. The patient died from liver metastasis ten months after the appearance of the ocular metastasis. In the second case visual disturbances appeared in the left eye after the removal of a primary carcinoma of the breast 11 month previously. The patient

had no pain, and was given no direct treatment of the eye. The patient died from cerebral and pulmonary metastasis one and one half months after the diagnosis of the ocular lesion. The diagnosis of metastatic tumors, indications for enucleation, antimitotic drugs, hormones and radiotherapy to maintain vision during the patient's life are discussed. It is pointed out that modern therapy for malignant lesion prolongs the life of the patient considerably, and choroidal metastases are encountered more frequently. (3 figures, 30 references)

Ray K. Daily.

Duke, J. R. and Dunn, S. N. **Primary tumors of the iris.** A.M.A. Arch. Ophth. 59:204-214, Feb., 1958.

Forty-three primary tumors of the iris examined at the Wilmer Institute between 1925 and 1956 are reported. Thirteen were benign; 28 malignant; one, a leiomyoma, and one of uncertain classification. (12 figures, 15 references)

G. S. Tyner.

Galvez Montes, J. and Moreno Lupianez, E. **Comments on a case of sympathetic ophthalmia.** Arch. Soc. oftal. hispano-am. 18:138-146, Feb., 1958.

A man, 30 years old, developed sympathetic uveopapillitis of the left eye 20 days after a perforating injury with loss of vision of the right eye. Thirty days after the injury the right eye was eviscerated, without arresting the loss of vision and ciliary pain in the left eye. Examination revealed uveal rests in the right orbit. They were excised and histologic study showed an intense infiltration with epithelioid and giant cells which had phagocytized the uveal pigment and nodules surrounded by lymphocytes. Therapy consisted of extraction of infected teeth and the prescription of prednisone, penicillin, streptomycin, iodine and vitamins and aspirin internally, and atropine and hydrocortisone locally. In the course of eight months the patient recovered a visual acuity of 5/7.5. Pigmented round foci of irregular size were left in the macula and small white foci larger than the drusen of the lamina vitrea. The interesting features of the case are the slow but progressive improvement following the excision of the uveal rests; the involvement of the posterior pole of the eye, and the intense retinal edema simulating the Vogt-Koyanagi-Harada disease; the disparity between the final ophthalmoscopic picture and functional acuity; and the normal electroretinogram after recovery. In view of the fact that 20 per cent of cases of sympathetic ophthalmia recover spontaneously, and that the patient had a large variety of medicaments, it is difficult to evaluate the effectiveness of any of the pharmacologic agents used in this case. (6 figures, 9 references) Ray K. Daily.

Harwood, T. R. **Diffuse perichondritis, chondritis and iritis; report of an autopsied case.** Arch. Path. 65:81-87, Jan., 1958.

A case of diffuse chondromalacia, generalized chondritis, and perichondritis is reported in a 33-year-old white man who came to autopsy. He also had unilateral iritis and bilateral scleritis, but the detailed ocular findings are not reported. The patient died after respiratory obstruction due to the collapse of his tracheal rings. All of the cartilage was found to be largely replaced by fibrous tissue which was infiltrated with plasma cells and lymphocytes. There is no report of the pathologic examination of the eyes. No etiologic agent could be determined but it is suggested that the syndrome may be a manifestation of hypersensitivity, possibly of the patient to his own cartilage. (6 figures, 16 references)

William S. Hagler.

Heer, Giuseppe. **The fluorescein test in diabetic rubeosis iridis.** Rassegna ital. d'ottal. **26**:352-363, Sept.-Oct., 1957.

In nine cases of diabetic rubeosis iridis, which are fully described, the fluorescein test was found to be positive whether the rubeosis was of long standing or incipient. In one instance the test was positive before the appearance of rubeosis, thus demonstrating an increase in permeability of the vessels of the uveal tract. (10 figures, 8 references)

Eugene M. Blake.

Howard, J. L. and Allen, H. F. **Treatment of experimental herpes simplex iridocyclitis with human serum gamma-globulin.** A.M.A. Arch. Ophth. **59**:68-72, Jan., 1958.

The course of experimental herpetic iritis in rabbits was shortened by intraperitoneal injection of human serum γ-globulin. It is suggested from the results of these experiments and from limited human clinical observations that the use of this therapy represents an additional approach to this difficult therapeutic problem. Selected cases where vascularization of the cornea has occurred should be more apt to be altered favorably by this therapy. (3 tables, 11 references)

Edward J. Swets.

Koch, C. **Clinical observations on the phakogenetic reaction.** Klin. Monatsbl. f. Augenh. **132**:26-31, 1958.

Four patients are described who had a mild iritis after an extracapsular cataract extraction on the second eye. (15 references) Frederick C. Blodi.

Papapanos, G. **Traumatic aniridia with good vision.** Klin. Monatsbl. f. Augenh. **132**:256-258, 1958.

Two cases are reported. One patient, after a repair of an indirect scleral rupture, regained vision to nearly 6/8, the other to 6/12. (6 references)

Frederick C. Blodi.

Scheie, H. G. and Fleischhauer, H. W. **Idiopathic atrophy of the epithelial layers of the iris and ciliary body.** A.M.A. Arch. Ophth. **59**:216-228, Feb., 1958.

The authors describe 97 eyes in 49 patients, in which there were intraocular pigment changes secondary to idiopathic atrophy of the retinal layers of the iris and probably of the ciliary body. The changes in this clinical entity consist of 1. punctate pigment deposition on the corneal endothelium, usually in the form of a Krukenberg's spindle; 2. speckling of the anterior surface of the iris with pigment; 3. pigmentation of the trabecular area of the anterior chamber; 4. pigment on the posterior surface of the lens, and 5. atrophy of the epithelial layers of the iris. Glaucoma is frequently present. The value of transillumination in the diagnosis is stressed, for the overlying stroma may be normal in appearance. (5 figures, 1 table, 17 references) G. S. Tyner.

## 9

## GLAUCOMA AND OCULAR TENSION

Berggren, Lennart. **Lack of effect of Citral on ocular tension.** Acta ophth. **35**: 451-453, 1957.

Citral is an unsaturated aldehyde present in the volatile oil of lemon and orange peels; it has been claimed to produce ocular hypertension due to endothelial damage in Schlemm's canal. The claim could not be confirmed by the author who injected 10 to 1,000 micrograms of Citral per kg. body weight intravenously into four rabbits and found no significant change of the ocular tension. No pathologic changes were observed in histologic specimens. (1 figure, 4 references)

John J. Stern.

Campbell, D. A., Jones, M., Renner, N. E. A. and Tonks, E. L. **Combined action of diamox and potassium bicarbonate in the treatment of chronic glaucoma.** Brit. J. Ophth. **41**:746-758, Dec., 1957.

In the continued use of diamox in chronic glaucoma the drug progressively loses its efficiency. When it is used with success over long periods it is always combined with miotics. The authors studied the effect of adding a potassium salt instead of a miotic. Three patients with chronic open-angle glaucoma were hospitalized and the diurnal variation of the tension was noted. The effect of a daily single dose of 250 mg. of diamox on the tension and the combined effect of 250 mg. of diamox daily and 1 gm. of potassium bicarbonate, three times daily was noted, and the effect of diamox on the tension was correlated with general systemic effects.

It was found that in each patient there is a daily peak of increased tension and that medication is best given at this time. The time of occurrence is not the same in all patients. When diamox was administered on successive days a diminishing response was noted which was also associated with a decline in the general systemic effect as shown by decrease in diuresis, decreased sodium excretion and a return to acidity of the urine. The addition of potassium bicarbonate in doses of 1 gm. three times daily proved successful in prolonging the benefit of the diamox. In addition, the side effects of the drug disappeared. (5 figures, 1 table, 17 references)

Morris Kaplan.

Hartmann, E. and Haye, C. **The cycloelectrolysis of Conrad Berens in glaucoma.** Ann. d'ocul. **191**:97-104, Feb., 1958.

The authors report 53 cases of glaucoma of all varieties in which cycloelectrolysis was used. The best results were obtained in aphakic glaucoma where there were only four failures in 14 cases. In four cases of acute glaucoma there were no failures. In five of six cases with glaucoma secondary to central retinal vein obstruction pain was controlled although two of them continued to show an elevated tension. Chronic glaucoma was less successfully treated. (1 table, 5 references)

David Shoch.

Kageyama, M. **Effect of diamox on outflow and production of aqueous.** Acta Soc. Ophth. Japan **61**:2156-2160, Nov., 1957.

Tonography was performed on normal and glaucomatous eyes before and after diamox administration. There was no evidence that diamox accelerated the outflow of aqueous. The decrease in ocular tension by diamox is due to a suppression of aqueous production. (1 figure, 1 table, 13 references)

Yukihiko Mitsui.

Kurus, Ernst. **Morphological analysis of the function and pathology of the intraocular pressure regulation.** Klin. Monatsbl. f. Augenh. **132**:201-224, 1958.

Flat sections were prepared which contained the trabecular meshwork and part of the ciliary body. The tissue was obtained by tearing out the uveo-trabecular part from the lateral segments of eyes enucleated because of primary glaucoma. In this way suprachoroid, meridional ciliary muscle and trabecular meshwork can be examined in toto. This uveo-trabecular system is regarded as a unit. The contraction of the meridional ciliary muscle opens the trabecular meshwork and widens Schlemm's canal. The nervous supply of this system is remarkably dense and endorgan-like structures could be detected in the ciliary muscle and also in the trabeculae. It can be assumed that we are dealing with the muscular (meridional ciliary muscle), connective tissue (trabeculae) and vascular (suprachoroid) endorgan of a central, regulating mechanism. The ageing process of this system was carefully studied. The trabeculae undergo

fibrosis and hyalinization. There is collapse and shrinking of the intertrabecular spaces. The muscle also undergoes marked hyalinization which starts in the perivascular areas. These senile changes do not occur with equal severity around the entire circumference and therefore they do not by themselves cause an increase in intraocular pressure. They may, however, predispose such eyes for glaucoma. (19 figures, 15 references)

Frederick C. Blodi.

Law, Frank W. **The problem of glaucoma.** Guy's Hosp. Gaz. **72**:6-12, Jan. 4 and **72**:25-30, Jan. 18, 1958.

The glaucoma problem is interestingly summarized. F. H. Haessler.

Leydhecker, Wolfgang. **A new method for clinical tonography.** Klin. Monatsbl. f. Augenh. **132**:77-95, 1958.

Two improvements are suggested. One is the use of the coefficient Po/C (the so-called "outflow value"). The same relationship was independently found by B. Becker. The second improvement is the use of a seven-minute tonogram. Here, only the last four minutes are used for evaluation and in this way the first, nonlinear, logarithmic part of the curve can be eliminated.

First 100 nonglaucomatous patients were examined. The mean of the C values was 0.28 with a standard deviation of $\pm 0.071$. The mean of the C values of the last four minutes of a seven-minute tonogram was 0.17 with a standard deviation of $\pm 0.041$.

On 108 eyes of 68 patients with early untreated glaucoma the value of tonography was tested. The patients were selected on the basis of one or more abnormal tonometric readings. They had normal discs and visual fields. The scleral rigidity was apparently normal. The percentage of probable or certain pathologic findings was higher when the C value of the last four minutes in a seven-minute tonogram was used. It was still higher, however, when the Po/C coefficient for this C value was determined. (7 figures, 7 tables, 20 references) Frederick C. Blodi.

Leydhecker, Wolfgang. **Miltown in glaucoma and before ocular operations.** Klin. Monatsbl. f. Augenh. **132**:224-233, 1958.

The effect of the drug was evaluated by repeated tonography on 19 eyes of 10 patients. These patients with chronic simple glaucoma received nothing but 800 mg. Miltown three times daily. The average tension decreased slightly and it could be shown that this change was due to a decreased flow. The C-values did not change appreciably.

Eleven patients (20 eyes) with chronic simple glaucoma were given Miltown for only a few days. Tonometric readings were done three times a day. The average intraocular pressure decreased slightly. In four more patients (six eyes) Miltown was added to a miotic and again the average pressure values were somewhat lower.

Miltown was used preoperatively in 94 patients who had had no previous ocular operation; 50 of these patients felt definitely tranquilized. The drug was also given to 38 patients who had had an ocular operation before and so could compare the effect of Miltown with the previous, standard preoperative medication; 31 of these patients preferred Miltown explicitly. (1 figure, 4 tables, 30 references)

Frederick C. Blodi.

Pompeu, C. **The value of visual field studies in the surgical and medical treatment of primary glaucoma.** Rev. brasil. oftal. **17**:93-101, March, 1958.

The author emphasizes the fact that the prognosis of glaucoma can be predicted to a great extent from the field changes found, and that they are also the indica-

tions as to when surgery should be performed. (5 references) Walter Mayer.

Reed, H. and Bendor-Samuel, J. E. L. **The early detection of glaucoma.** Canad. M. A. J. **78**:6-10, Jan. 1, 1958.

Tonometry was done as a routine measure in 2,000 ophthalmic examinations of individuals over 40 years of age. Three percent of the patients were found to have glaucoma and half of these would have been missed if the tension had not been taken, since other signs and symptoms were lacking. The diagnosis was confirmed by further tests including gonioscopy and tonography. The authors make a strong case for taking the tension of every individual over 40 years old so that treatment may be started early if glaucoma is found. They believe that the general physician should do this and recommend that medical schools teach all undergraduates how to take an ocular tension. (2 figures, 6 tables, 15 references) Edward U. Murphy.

Rud, Erick **Posner-Schlossman's syndrome (Glaucomatocyclitic crises). Report of a case.** Acta ophth. **35**:406-410, 1957.

A 44-year-old woman is described who had numerous glaucomatocyclitic crises during the past 16 years. Vision or fields were not affected. Cyclodialysis and iridectomy failed to control the condition. The possibility of a relation between the patient's ocular disease and her frequent attacks of tonsillitis is discussed. (7 references) John J. Stern.

Vail, Derrick. **Glaucoma headache.** Med. Cl. North America pp. 543-546, March, 1958.

Acute congestive glaucoma occurs in individuals with blocking of a narrow chamber angle associated with a vasodilatation of the iris and ciliary body. Dilatation of the pupil occurs, the eye becomes congested, and the anterior chamber is shallow. The pain is sharp, boring, terrible and prolonged. Iridectomy is the treatment of choice. (1 reference) Irvin E. Gaynon.

Valu, L. **Evaluation of diathermic operations for combating glaucoma, especially cycloanemization.** Szemeszet **94**: 160-170, 1957.

The diathermy operations for combating glaucoma are based on the reduction of the production of aqueous humor. This can be achieved by two approaches: 1. by injury of the ciliary body (direct method), for example, cyclodiathermies, and 2. by sclerosing some vessels passing to the ciliary body (indirect method). The latter are called angiodiathermies. The author gives a detailed description of the technique, action, mechanism, and results of cycloanemization. Of late, cycloanemization has been combined with postoperative corneal puncture. Puncture and delicate pergamentization were followed by amelioration of operative results. Good results were obtained by cycloanemization in 87.7 percent of glaucoma simplex and 64 percent of inflammatory glaucoma. Gyula Lugossy.

Viikari, K. and Tuovinen, E. **Hypotony following cyclodialysis surgery.** Acta ophth. **35**:543-549, 1957.

Of 291 eyes on which cyclodialysis had been done, 24 eyes showed hypotony after more than one year. Whenever gonioscopy was possible an open cleft was found. The width of the chamber angle was not decisive. Cyclodialysis performed temporally leads more easily to hypotony. Hypotony seemed to have a slightly unfavorable effect on visual acuity and fields. The wider the area to be dialysed the greater the chances for an open cleft, but the size of the cleft was

not directly proportional to the degree of hypotony. In 11 eyes with severe hypotony, electrocoagulation was used in an attempt to elevate the tension by reducing the size of the cleft; in six the tension could be raised, in some of these the result was an attack of acute glaucoma. In four eyes the injection of potassium carbonate into the anterior chamber had no effect on the hypotony. (1 table, 4 references)

John J. Stern.

Viikari, K. and Tuovinen, E. **Cyclodialysis surgery in the light of follow-up examinations.** Acta ophth. **35**:528-542, 1957.

Retinal detachment as a complication of cyclodialysis is practically nonexistent. Minor choroidal atrophy and pigment spots frequently occur peripheral to the cyclodialysis scar. A cyclodialysis cleft and normal or hyponormal pressure go together, but a cleft is no absolute requirement for normal pressure. (2 tables, 20 references) John J. Stern.

Weekers, R., Lavergne, G. and Prijot, E. **Correction of tonometric measurements in subjects with either a high or low scleral rigidity.** Ann. d'ocul. **191**:26-31, Jan., 1958.

The authors illustrate the errors that can result when scleral rigidity is neglected in measuring ocular tension. This is particularly true of the high myope where the scleral rigidity is often reduced and a beginning hypertension may be overlooked or the condition wrongly diagnosed as "glaucoma without hypertension." (4 tables, 6 references)

David Shoch.

Winter, F. C. **Glaucoma following occlusion of the central retinal artery.** Tr. Pacific Coast Oto-Ophth. Soc. **38**:9-16, 1957.

The author presents a case of central retinal artery occlusion in one eye, followed four weeks later by an intractable glaucoma, which did not respond to miotics and which required enucleation a few days later. He reviews the four other cases of this type of glaucoma which have been reported and describes the pathologic findings in the enucleated eye. During the discussion of this paper, Kronfeld stated that he felt the pathology in such cases consisted in an arteriovenous fistula, which would be primarily an arteriolar lesion, but would raise pressure in the venous system and develop glaucoma. (4 figures, 3 references) Walter Mayer.

## 10

## CRYSTALLINE LENS

Avasthy, P. and Gupta, R. B. L. **Traumatic cataract.** Brit. J. Ophth. **42**:240-241, April, 1958.

The authors describe a traumatic cataract in a 12-year-old child; the lens regained its transparency within 10 days after the injury. Therapy consisted of subconjunctival injections of a mixture of streptomycin and penicillin, and instillation of a solution of hydrocortisone and atropine. (1 figure, 1 reference)

Lawrence L. Garner.

Barraquer, J. and Bailbre, N. **Incidents, accidents, and possible complications with plastic lentilles in the anterior chamber. Personal experience in the first series of 132 cases.** Bull. et mém. Soc. franç. d'opht. **70**:233-257, 1957.

The replacement of the opaque lens by an artificial clear lens is so tempting that the enthusiasm for such endeavors is easily understood, in spite of the great potential danger and certain technical difficulties. The advantages of the anterior chamber lentille as compared to the Ridley-lens are as follows. The anterior chamber lentille can be inserted after

extra- or intracapsular cataract extraction, a membrane can be cut behind the lentille, if indicated, it does not fall into the vitreous and, if necessary, it can be easily removed.

Untoward incidents occur whenever the size or curvature of the lentille has been misjudged. Accidents depend on the surgical techniques and potential injury to the corneal endothelium and the iris tissue. The most severe complications were hyphema, hypertension, inflammation, inflammatory reactions with ocular hypertension and corneal edema.

132 eyes with cataracts were operated on between July, 1954 and February, 1957. There were 26 surgical complications; 12 patients got well without a second operation; 12 recovered after a second operation. Two cases were classified as unsuccessful; one patient developed an exudative membrane and the other a hypertensive iridocyclitis. In spite of this brilliant success the authors themselves advise cautious evaluation in every single case. (24 figures) Alice R. Deutsch.

McLean, J. M., Hogan, M. C. and Maumenee, A. E. **Symposium: Postoperative cataract complications.** Tr. Am. Acad. Ophth. 61:20-68, Jan.-Feb., 1957.

McLean, John M. **Delayed restoration of the anterior chamber, secondary glaucoma, iris incarceration and prolapse, corneal edema.** pp. 20-32.

The author lists the following causes of a leaking wound—inadequate closure, sutures placed too deeply, wound incarceration, trauma, suppression of aqueous, choroidal detachment and vitreous edema. The results are described as peripheral anterior synechias, corneal edema and vitreous adherence, and iris-vitreous adhesions. For prophylaxis tight and accurate wound closure is essential. The author has abandoned routine air injection. Treatment, after allowing time for spontaneous recovery, consists of repair of the leaking wound, air injection with or without sclerotomy, removal of deep sutures, the ingestion of diamox, and cautery.

The causes of secondary glaucoma are peripheral anterior synechias, epithelial down-growth, hemorrhage, pupillary block, and unrecognized primary glaucoma. It is important to evacuate blood or cortex, to treat iridocyclitis, to oppose epithelial down-grown, and to give mydriatics and diamox in pupillary block. Surgical management consists of iridectomy in pupillary block, cyclodialysis, and cyclodiathermy.

Iris incarceration and prolapse may be the result of inadequate reposition, insecure closure, trauma, and simple extraction without iridotomy or iridectomy. A flat anterior chamber, secondary glaucoma, iritis, sympathetic ophthalmia, infection, hypotony, ectopic pupil, and high astigmatism may be its permanent sequelae. These complications may be avoided by secure closure and careful toilet of the wound. The use of strong miotics is indicated and if this fails to replace iris, excision or cautery (which is dangerous) must be done.

Sympathetic ophthalmia may be caused by iris prolapse, ruptured wound, expulsive hemorrhage, or traumatic surgery. Prophylaxis consists of minimal trauma to tissues and prompt recognition and repair of iris prolapse and wound rupture. The treatment of choice is systemic therapy with adrenal steroids unless the eye must be enucleated.

Corneal edema may be caused by corneal trauma (especially to the endothelium), vitreous adhesions, endothelial disease, and glaucoma. Its results are rarely serious. To prevent the development of corneal edema it is important to avoid trauma. The edema often disappears with treatment; if it does not, air insufflation or diamox may be used. (8 figures, 21 references)

Hogan, Michael J. **Postoperative irido-**

**cyclitis, postoperative infection, and after-cataract.** pp. 35-50.

The author lists trauma, incarceration of foreign materials in the wound, retained lens, phacoanaphylaxis, and nonsuppurative infection as causes of postoperative iridocyclitis. As causes of postoperative infection Staphylococcus aureus to the history, observation of the lids, leads other organisms. Prophylaxis should begin preoperatively by attention conjunctiva, and lacrimal apparatus and the topical administration of drugs for about two weeks before surgery, preferably antibiotic ointments. In the prevention of infection, gloves worn during surgery, proper skin cleansing of the operative field, and isolation of the lid margins by drapes are important. Sterilization of nonsharp instrumnets in the autoclave and the sharp ones by dry air should be mandatory. In the postoperative prevention of infection penicillin should be used subconjunctivally at the termination of surgery. Treatment of postoperative infections should begin with a culture of the lid margin and wound flap and this should be followed by systemic drug therapy, topical antibiotic ointment, subconjunctival penicillin every 24 hours, removal of sutures, and irrigation of the anterior chamber when indicated. In late postoperative progressive infections systemic therapy or intravitreal injections of antibiotics are indicated.

In the complication of after-cataract, thin membranes should be treated by discission with the Zeigler knife with minimal traction; thick membranes should be incised at a selected point, with a knife the tip of which is kept close to the membrane itself with little traction. Fibrous membranes are best treated by incision with a Berens or DeWecker scissors. (27 figures, 4 references)

Maumenee, A. Edward. **Epithelial invasion of the anterior chamber, retinal detachment, corneal edema.** pp. 51-68.

The author notes an incidence of epithelial invasion of the anterior chamber of 14 percent in 1,186 eyes enucleated after cataract extraction. He states that histologically it is difficult to distinguish an epithelial cyst from a down growth, but the clinical picture and course may differ. The former is usually easy to diagnose clinically, whereas a down-growth is difficult to recognize without the aid of the slitlamp. A cyst may be removed surgically if it is growing and ignored if it gives rise to no symptoms. In epithelial downgrowth the author recommends rubbing the posterior surface of the cornea with a swab dipped in 70 percent alcohol and wrung dry; the epithelium then is removed with a curette.

Retinal detachment is discussed in relation to several of the important questions, namely the relationship of cataract extraction to retinal detachment, predisposing factors to retinal detachment, and prevention of retinal detachment.

Corneal edema during the immediate postoperative period and later may occur as a result of 1. a defect in wound closure, 2. excessive trauma to the posterior stratum of the cornea at surgery, 3. aggravation of abiotrophies, 4. contact of vitreous with the cornea, and 5. foreign body in the chamber angle. The treatment for each is discussed.

The incidence of anterior chamber hemorrhages could be reduced to almost zero if the cataract incision were properly placed and adequate corneoscleral sutures were used.

Changes in the macula occur as an acceleration of pre-existing changes or may be ascribed to iridocyclitis or a rupture of the hyaloid face of the vitreous. (17 figures, 4 tables, 28 references)

Theodore M. Shapira.

Scorciarini-Coppola, A. and Casa, G. **Cataract associated with hypopituitarism and hypothyroidism in patients with die-**

**tary deficiency.** Riv. oto-neuro-oftal. **32**:452-461, July-Aug., 1957.

The authors present the case histories of two brothers who had subsisted for several years on a completely deficient diet. They discuss the possible relationship between the nutritional deficiency and the endocrine disturbances. (4 figures, 16 references) William C. Caccamise.

## 11

## RETINA AND VITREOUS

Carriker, F. R. **Juvenile disciform degeneration.** Tr. Pacific Coast Oto-Ophth. Soc. 38:109-114, 1957.

The author presents a case of disciform degeneration of the macula in a 22-year-old man. After reviewing the pathologic findings he sees no reason for making a special classification for the juvenile form, as the pathologic findings are the same as in the so-called senile disciform degeneration. (8 references) Walter Mayer.

Hervouet, F. **Forms of degeneration of Bruch's membrane and of the pigment epithelium of the retina.** Ann. d'ocul. **191**:105-148, Feb., 1958.

In a series of 50 photomicrographs the author presents the various types of degeneration present in Bruch's membrane and in the pigment epithelium of the retina. He feels that lesions of Bruch's membrane may arise from the external layers which are of mesodermal origin or from the internal layers which are of ectodermal origin.

The degenerations of the pigment epithelium are then presented. These are again divided into two groups: those seen when the retina is intact and those associated with detachment of the retina where the pigment epithelium is in contact with subretinal fluid. From his findings the author concludes that retinal detachments are caused by disease of the pigment epithelium and the choroid. The primary pathology is a subretinal exudate which, by its volume and pressure, causes a tear in the already detached retina. (50 figures, 5 references) David Shoch.

Pereira Gomes, Julio. **Bilateral hole in the macula.** Arq. brasil. de oftal. **20**:383-396, 1957.

Although a hole in the macula has been described by many authors since 1865 and observed in clinical practice on innumerable occasions, its bilateral occurrence is considered to be quite rare. This is a case report of a 21-year-old patient who had poor vision in each eye since the age of 11 years. Examination revealed the presence of bilateral hole in the macula. Each hole was a bit larger than is usually observed and there were associated areas of peripheral cystic degeneration of the retina. It is postulated that the holes resulted from ruptured macular cysts. Visual field studies showed a bilateral central scotoma and some constriction of the peripheral fields. An incidental finding was the presence of chronic simple glaucoma in the left eye, treated successfully by cyclodialysis. (5 figures, 10 references) James W. Brennan.

Peters, G. and Seitz, R. **Perivascular sheathing in the retina.** Klin. Monatsbl. f. Augenh. **132**:377-383, 1958.

This sheathing appears as a white, nearly transparent column around the vessel without embarrassing its lumen. Two such cases could be examined histologically. The first eye was from a man with prolonged papilledema and the sheathing was mostly around the veins. The sections revealed an opening of the intraadventitial spaces which contained numerous leucocytes. The second eye was from a patient with severe hypertension who showed some periarterial sheathing. Here again the intraadventitial spaces

were open but this time filled with a protein-rich fluid. (5 figures, 4 references)

Frederick C. Blodi.

Stampelli, Benedetto. **Methods to cure a retinal detachment with macular hole without destruction of retinal elements.** Bull. et mém. Soc. franç. d'opht. 70:70-80, 1957.

Full-thickness holes of the macula without tears in the periphery are fortunately rare. They are difficult to handle and they present a real challenge to the attending surgeon. The routine procedures for the closure of retinal holes are followed by a necrosis of the adjoining retinal elements and therefore can not and should not be used at the posterior pole. Many attempts have been made to cause a localized fibrinous inflammation in the macular region without necrosis of the visual elements. Introduction of human plasma in the retroretinal space, scarification with a knife under ophthalmoscopic control, photocoagulation and chemical coagulation by various drugs have been used with more or less success. Most of these techniques are very difficult because the area is very small, very delicate and difficult to reach. The method, introduced in this study, consists in the use of a mercury vapor lamp (Maison Hanau or Birch-Hirschfeld-model), placed 20 to 25 cm. away from the cornea with careful shielding of the adjoining skin. The initial treatment time is one-half hour and might be increased to one to one and one-half hours. Every irradiation period must be followed by an injection of 1½ to 2 cc. of a 16 or 18 percent solution of sodium chloride behind Tenon's capsule. Binocular bandage and bed rest for three or four days should be ordered after every treatment. A bed rest for two or three weeks was suggested after the treatment itself was terminated. When the retina does not flatten after bed rest, the standard treatment should be used first and the closure of the hole in the macula reserved for a second procedure and should always include an air injection into the vitreous. Mild uveal irritation was observed as the only complication.

Among the eight patients the treatment was completely successful in five; only one aphakic was included in this series. This certainly is a significant achievement considering the poor visual prognosis of macular holes. (2 figures)

Alice R. Deutsch.

Tamler, E. **Observations on the pathology of retinal detachment operations on human eyes.** Tr. Pacific Coast Oto-Ophth. Soc. 38:59-96, 1957.

The author studied sections of eyes after detachment surgery, which was either diathermy or penetrating or lamellar scleral resection. The tissue was taken after enucleations for other ocular reasons or at the time of autopsy. He comments on healing of wounds, avoidance of vortex veins, reaction around sutures and star folds of the retina. (36 figures, 22 references)

Walter Mayer.

Van Buren, J. M. **Septic retinitis due to Candida albicans.** Arch. Path. 65:137-146, Feb., 1958.

Infections with C. albicans have been increasingly reported during the last decade. Patients of all ages are affected, especially those receiving antibiotics and cortisone over long periods, and it is known that over 10 percent of the population has a subclinical infection. A case of bloodstream sepsis with the organism is reported here. One month before death a retinal lesion of the Roth spot type appeared which on section showed yeast elements in an abscess of the nerve fiber layer. The author also carefully discusses the pathology of Roth spots in general. (7 figures, 44 references)

Edward U. Murphy.

## 12

### OPTIC NERVE AND CHIASM

Colombo Bolla, M. **Dissociation between the visual and pupillomotor functions following cranial trauma with fracture of the orbit.** Riv. oto-neuro-oftal. **32**:552-560, Sept.-Oct., 1957.

The author reviews the literature concerning cases in which there was trauma to the optic nerve with recovery of visual function but with a permanent disturbance in the photomotor reflex. He then reports his findings in a 14-year-old boy who was involved in an automobile accident. When examined immediately after the accident, the patient was unable to see with the right eye. There was anisocoria with dilatation of the right pupil. The right pupil did not react to direct illumination but did react consensually. The left pupil reacted normally to direct illumination, but it did not react consensually. The visual acuity in the right eye was 20/200 and could not be improved with correction. The visual acuity in the left eye was 20/20. Five days later the vision with the right eye had improved to 20/30 and by the seventh day it had reached 20/20. However, the pupillary picture remained the same. Reëxamination five months later revealed no significant additional changes. The author points out that one must assume that the optic nerve contains separate pupillary fibers. (2 figures, 21 references) William C. Caccamise.

Mollica, V. **Ethmoidal-sphenoidal sinusitis and retrobulbar optic neuritis.** Riv. oto-neuro-oftal. **32**:369-396, July-Aug., 1957, and 489-538, Sept.-Oct., 1957.

Initially the author describes the anatomy of the posterior nasal sinuses and their vascular and nervous relationships to the optic nerve. Clinical observations led the author to the conclusion that in certain cases drainage of the ethmoidal and sphenoidal sinuses is indicated in retrobulbar neuritis. (20 figures, 243 references) William C. Caccamise.

Peters, W. **Arteriosclerotic optic neuritis.** Klin. Monatsbl. f. Augenh. **132**:363-377, 1958.

Nine patients are described. Systemic atherosclerosis is often present. The fundus may appear normal. Vasodilators may be beneficial. (3 figures, 42 references) Frederick C. Blodi.

## 13

### NEURO-OPHTHALMOLOGY

Blomberg, Lars-H. **The significance of so-called "end-position nystagmus" and its relation to nystagmus produced by Evipan.** Acta Psychiat. & Neurol. **33**:138-150, 1958.

The study shows that end-position nystagmus at 40 degrees of lateral deviation in 25 patients with Ménière's syndrome, 17 with signs of unilateral space-taking cerebral lesions, and six with vertigo, is not to be considered normal but a sign of disturbed equilibrium of the oculomotor system. When the patient has been given Evipan the nystagmus is more conspicuous. Examination before and after the administration of Evipan, particularly if there is a side-difference, is of value in the recognition of a lesion in the oculo-vestibular system. (5 figures, 2 tables, 11 references) Irwin E. Gaynon.

Dubois-Poulsen, A. and Magis, C. **Extraordinary enlargements of the blind spot, independent of swelling of the nerve head.** Bull. et mém. Soc. franç. d'opht. **70**:12-24, 1957.

The enlargement of the blind spot, either in the form of a superior and inferior scotoma or as an overall increase in size, can usually be ascribed to abnormalities of the fundus. An extraordinary enlargement of the blind spot with or without encroachment of peripheral isopters,

without spatial summation and without any visible stasis or any fundus anomaly is described as a new neuro-ophthalmologic symptom complex. This syndrome is easily identified by the characteristic field changes.

The campimetric records of the neurologic service at Quatre-Vingts and at St.-Anne were reviewed to establish a possible relationship between these functional disturbances and specific anatomic changes. Thirteen cases were found and are described and discussed at length. Two of the patients had had intracranial trauma, two aneurysm, four had pituitary adenoma, one a noncystic craniopharyngioma, one a cystic tumor of the third ventricle, two an enlarged ventricular system, and one an expanding lesion of the left temporo-occipital region. These observations show that the syndrome is associated with lesions in the area of the chiasm. A distention of the anterior ventricular system, especially of the lateral ventricle, was seen more often than an enlarged third ventricle. A displacement of the fourth ventricle was found only four times. (8 figures) Alice R. Deutsch.

Hager, Günter. **Ophthalmologic observations and problems in neurofibromatosis.** Klin. Monatsbl. f. Augenh. **132**:350-363, 1958.

This is a short review of the subject and five representative cases are described in two of which the optic nerve was involved. (12 figures, 1 table, 45 references) Frederick C. Blodi.

Halpern, L., Feldman, S. and Peyser, E. **Subarachnoid hemorrhage with papilledema due to spinal neurofibroma.** Arch. Neurol. & Psychiat. **79**:138-141, Feb., 1958.

Hemorrhage from a spinal cord lesion can cause increased intracranial pressure and papilledema. Cerebrospinal fluid absorption is interfered with, perhaps by fibrin. A case is reported in detail in which low back pain was the first symptom. The entry of blood into the subarachnoid space and cranial cavity after several hours or days may produce the picture of an intracranial lesion and divert attention from the site of the primary lesion. A spinal angioma is the commonest cause of such a hemorrhage. Ependymomas and neurofibromas are less frequently found. (3 figures, 12 references) Edward U. Murphy.

Macrae, D., O'Reilly, S. and Keville, F. J. **The neuro-ophthalmological manifestations of the collagen diseases.** Tr. Pacific Coast Oto-Ophth. Soc. **38**:17-37, 1957.

The author reviews the most important collagen diseases, which are frequently associated with neuro-ophthalmologic manifestations. He remarks that while rheumatoid arthritis and rheumatic fever are the most frequent collagen diseases, they do not have neuro-ophthalmologic manifestations often, while lupus erythematosus, polyarteritis nodosa, scleroderma and dermatomyositis usually are accompanied by a great variety of neuro-ophthalmologic symptoms. The author describes briefly a few typical examples of these collagen diseases. He included temporal arteritis in the group of polyarteritis, even though only one great vessel is involved as it is his feeling that several other extra- and intracranial vessels may become involved at a later date. Collagen diseases should be suspected in women between 20 and 50 years of age with undiagnosed fever, malaise, arthralgia and myalgia. (10 figures, 20 references) Walter Mayer.

Schirmer, R. **Ophthalmic herpes zoster.** Klin. Monatsbl. f. Augenh. **132**:252-253, 1958.

Two patients are reported with extraocular muscle palsies as complications of herpes zoster. One patient had a palsy of

the fourth cranial nerve and the other of the third. (5 references)

Frederick C. Blodi.

Schweitzer, A. **A typical postoperative course of chiasmatic syndromes.** Arch. chil. de oftal. **39**:102-105, July-Dec., 1957.

The chiasmatic syndrome is characterized by simple optic atrophy and bitemporal hemianopsia, usually produced by a tumor in the sella turcica, of which the most common is a tumor of the hypophysis. If the tumor can be controlled, one obtains a stabilization of the visual signs and in some cases there may be even a complete recovery from the ocular standpoint.

The author presents two cases. In his first case, one of craniopharingioma, there was temporal hemianopsia in the right eye and the left eye had only slight perception in the inferior sector of the temporal field. After operation, complicated by the fact that the patient had massive edema which required a second operation six days after the primary surgery, there was a very marked recovery of the eyes, and the patient was again able to return to his office work.

The second case is one of diabetes and eosinophilic adenoma of the hypophysis. The patient was irradiated and seemed to obtain a good recovery. Two years later he again had serious visual difficulties, consisting of a decrease in acuity and bitemporal constriction of his visual fields. It was thought that this constituted a recurrence of his tumor, but two surgical explorations failed to reveal any space-occupying lesion in the hypophyseal region. The patient went on to develop a picture of complete mental deterioration. An exact diagnosis never was made, and the case is being presented here to show how the outcome in cases of chiasmatic syndromes cannot be predicted.

Walter Mayer.

## 14

## EYEBALL, ORBIT, SINUSES

Carey, Patrick, C. **Epidermoid and dermoid tumours of the orbit.** Brit. J. Ophth. **42**:225-239, April, 1958.

The origin and nature of epidermoid and dermoid tumors are discussed and the pertinent diagnostic and surgical procedures are described. Seven cases are described in six of which X-ray evidence of a bony lesion was found. (23 figures, 23 references) Lawrence L. Garner.

Ferrer Arata, A., Gomez Morales, A. and Guyman Heredia, L. N. **Orbitonometry in orbital tumors.** Arch. oftal Buenos Aires **32**:319-332, Dec., 1957.

On the basis of previous studies in normal subjects (Orbito-tonometria clinica, Arch. oftal. Buenos Aires 29:605, Dec., 1954; abstracted in Am. J. Ophth. 40:606, Oct., 1955), the authors report the orbitonometric readings recorded in 11 cases of diverse expanding orbital lesions, namely of meningioma of the sphenoidal ridge, orbital osteoma, mixed tumor of the lacrimal gland, lymphoma of the lacrimal gland, diffuse, malignant lymphomatous infiltration of the orbit, astrocytoma of the optic nerve, hydatic cyst, arteriovenous aneurysm, and orbital varices, one case each, and two cases of secondary orbital invasion by antral carcinoma. Findings are correlated with the information furnished by ordinary exophthalmometric, radiologic and physical examinations, in order to disclose whether differences in site, size, consistency and fluid content of the tumor are clearly reflected in the starting point level, slope and overall fall of the curves obtained. From the results presented it can be said that only data on the compressibility and resiliency—and very occasionally on the location—of the mass responsible for the proptosis can be gained from the study of the course and extension of the forced backward dis-

placement of the eyeball, and this in a limited degree. (11 graphs, 2 tables, 29 references) A. Urrets-Zavalia, Jr.

Jackson, Harvey. **Pseudotumour of the orbit.** Brit. J. Ophth. **42**:212-225, April, 1958.

Pseudotumors are discussed and three cases with their diagnostic difficulties are described. All necessary laboratory procedures should be considered and even then surgical exploration of the orbit may be necessary to make a diagnosis. Interestingly in one of the patients reported, none of the findings led to a diagnosis and proptosis was not alleviated; since surgery was refused, antiluetic therapy was used empirically and the proptosis disappeared. The serologic tests were negative. This form of therapy is recommended since improvement has been occasionally noted. Cortisone therapy is reserved for trial in those cases in which there is no satisfactory response. (11 figures, 5 references)

Lawrence L. Garner.

Langmaid, C. and Daws, A. **Pulsating exophthalmos in von Recklinghausen's disease.** J. Neurol., Neurosurg. & Psychiat. **21**:42-46, Feb., 1958.

Exophthalmos in cases of von Recklinghausen's disease may be due to congenital absence of part of the orbital wall. The ordinary pulsations of the brain are transmitted to the globe and a pulsating exophthalmos results. Two cases are discussed. An erroneous diagnosis of vascular sphenoid-wing meningioma was made in the first, leading to an unnecessary craniotomy. The second patient did have a frontal glioma in addition to the congenital changes in the orbital wall. On X-ray plates the typical bony changes in this condition are clear cut, in contrast to the ill-defined margins of tumor erosion. Recognition of this condition will prevent unnecessary surgery for tumor. (4 figures, 14 references) Edward U. Murphy.

McCullagh, E. P., Clamen, M., Gardner, W. J., Kennedy, R. S. and Lockhart, G. **III. Exophthalmos of Graves' disease: a summary of the present status of therapy.** Ann. Int. Med. **48**:445-470, March, 1958.

Several modes of treatment are discussed from the standpoint of the authors' experience. Iodine, estrogens, and androgens were of no value. Tri-iodothyronine was effective in less than half of 20 cases and two patients became worse. ACTH or cortisone produced symptomatic relief in the 10 patients who used it, but in only two did the proptosis decrease with the swelling of soft tissue. Radiation of the pituitary produced no real improvement. Pituitary surgery was done in nine patients with extremely severe exophthalmos and results were encouraging in all. With recent improvements in surgical technique and replacement therapy for severe pituitary failure, this treatment deserves further trial and investigation. (8 figures, 16 tables, 20 references)

Edward U. Murphy.

Pajor, R. **Cholesteatoma of the orbit.** Klin. Monatsbl. f. Augenh. **132**:248-252, 1958.

A dermoid cyst was removed surgically in a 41-year-old man. (4 figures, 13 references) Frederick C. Blodi.

## 15

### EYELIDS, LACRIMAL APPARATUS

Cuccagna, F. **The possible influence of sphenopalatine ganglion block on lacrimal secretion.** Riv. oto-neuro-oftal. **32**:568-574, Sept.-Oct., 1957.

The author evaluated the effect of sphenopalatine ganglion block on lacrimation in 15 patients with a complaint of watery eyes. The block was obtained by touching the nasal mucous membrane

over the posterior portion of the middle nasal concha with 10-percent silver nitrate. An apparent recovery was obtained in six of the patients. Five patients manifested improvement and there was failure in the remaining four. (1 figure, 18 references) William C. Caccamise.

Espildora Luque, C. **A case of acute dacryoadenitis?** Arch. child. de oftal. **39**: 98-101, July-Dec., 1957.

The author presents the case history of a patient with very marked swelling of the entire face, especially of the left side. The lips were increased to several times their normal size. The swelling was absolutely painless except in one point at the external portion of the left upper lid. The color of the skin was pale, even in the points of the greatest edema and there was no redness or heat in the skin. Eye examination was almost impossible because of the massive edema, but the globe appeared to be entirely normal and perfectly white. The general status of the patient was one of extreme toxicity which subsided slowly after one week of intensive antibiotic therapy. Because of the lack of any localized inflammatory signs the author presumes that this is a case of dacryoadenitis, which in its acute form is characterized by appearing very suddenly. (2 figures) Walter Mayer.

Illig, Karl M. **A new operation for lagophthalmus.** Klin. Monatsbl. f. Augenh. **132**:410-411, 1958.

A piece of gold foil enveloped in plastic is implanted into the upper lid. It lies between skin and tarsus and weighs 1.3 to 1.5 gm. (1 figure) Frederick C. Blodi.

Jain, N. S. **Blaskovicz operation.** Brit. J. Ophth. **42**:242-243, April, 1958.

The Blaskovicz operative procedure was used in 35 cases of congenital ptosis. The results were good in 26 patients although there was lagophthalmos or overcorrection in 16 of them. The author suggests slight undercorrection of the ptosis. (3 figures, 1 table, 6 references) Lawrence L. Garner.

Marston, E. L. and Bland, R. W. **Angular dermoids.** Arch. Surg. **76**:467-468, March, 1958.

Dermoid tumors occurring in the temporal portion of the eyebrow are brought to the attention of general surgeons. Excision is recommended under general anesthesia before they attain an unsightly size. Reference is made to their possible intraorbital extension. (2 figures, 5 references) Edward U. Murphy.

Moldenhauer, W. **Results after contact irradiation of epitheliomas of the lid.** Klin. Monatsbl. f. Augenh. **132**:335-350, 1958.

Of 117 tumors treated, 51 were biopsied; 31 were basal cell epithelioma, 10 squamous cell epithelioma and 10 mixed. 50 kV was used with a STD of 2 or 4 cm. The individual dose was 400 to 1000 r, the total was usually 8000 r. In 85 patients the first treatment resulted in recovery, 20 cases remained indetermined (death from intercurrent diseases, no follow-up), one patient died from metastases. Eight patients with recurrences had a second series of treatment and were cured; 28 patients were followed for less than three years and 22 patients from three to five years. A cicatricial ectropion occurred in five patients. (8 figures, 5 tables, 72 references) Frederick C. Blodi.

Pavisic, Zvonimir. **Surgical correction of a lid coloboma with cartilage from the auricle.** Bull. et mém. Soc. franç. d'opht. **70**:62-69, 1957.

Irregular coloboma of the upper lid are only too often the unfortunate end result of a late trachoma. The new technique consists of an intermarginal incision in the region of the coloboma, mobilization of a conjunctival flap, preparation and inser-

tion of a cartilaginous graft taken from the antitragus and securing of the graft by adequate sutures. The author has used this procedure successfully in 10 cases. (11 figures, 12 references)

Alice R. Deutsch.

Swan, K. C. and Keizer, J. P. **Levator advancement and resection—simplified technique.** Tr. Pacific Coast Oto-Ophth. Soc. **38**:167-173, 1957.

The authors have modified the Blascowics ptosis operation and have used their new technique in over 50 cases with apparently good results. The conjunctiva is incised above the tarsus and the levator and Mueller's muscles are detached from the tarsus. The levator is then resected almost to the orbital septum, brought forward in front of the tarsus and sutured immediately behind the eye lashes at the lid margin. Care is taken not to include the orbital septum in the sutures, as this would bring about a poor cosmetic result; the authors feel that whenever this occurs, it is due to the fact that the septum has been included in the sutures.

Walter Mayer.

## 16

### TUMORS

Allen, H. C., Jr., Thomas, J. R., Wahlen, H. E., Daily, L. D., Jr. and Griffey, E. W. **Diagnosis of intraocular neoplasms using radioactive phosphorus.** Texas St. J. Med. **54**:17-21, Jan., 1958.

Tumor cells, having a greater rate of metabolism than the surrounding normal cells, will take up an increased amount of radio-active phosphorus. Radioactive studies can be an important aid in the differential diagnosis between benign and malignant tumors of the anterior segment of the eye and also in evaluating the presence of a malignancy in retinal detachment where ophthalmoscopy and transillumination are uncertain. The results were good in melanoma but gave false positives in retinoblastoma. (23 references)

Irwin E. Gaynon.

von Burstin, Dorothea. **The formation of melanomas after adrenaline.** Klin. Monatsbl. f. Augenh. **132**:329-335, 1958.

Instillation of adrenaline or subconjunctival injection into albinotic rabbits did not produce any pathologic changes. Repeated subconjunctival injection into brown rabbits produced small brownish nodules after a year. Histologic examination showed that these nodules consist of proliferating and pigment-bearing epithelial cells. (2 figures, 13 references)

Frederick C. Blodi.

## 17

### INJURIES

Christensen, Lewellyn E. **Thermal burns of the eyelids and chemical burns of the eyes.** Minnesota Med. **41**:5-7, Jan., 1958.

The eyeball is burned in 12 percent of burns on the eyelids. First aid consists of the application of dry sterile dressings and control of pain. An initial layer of petrolatum or boric-impregnated mesh gauze is applied to provide gentle compression and an absorbent material for the fluid exudate. Early grafting is advocated in third degree burns of the skin and conjunctiva.

The immediate treatment for all types of chemical burns is the quick irrigation with water at the nearest source of supply. This is done for at least five minutes. The eye is then anesthetized and irrigated with normal saline solution for 30 minutes. Any solid particles are removed. An antibiotic ointment is applied and the associated iritis is treated.

Irwin E. Gaynon.

Harms, Harold H. **Eye signs of head injury.** Louisiana St. Med. Soc. J. **110**:127-133, April, 1958.

The author discusses the diagnostic

value of such changes of the lids as seventh-nerve paralysis, ptosis, and the differential value of the black eye; of the pupillary and corneal reflexes, of conjugate deviation, paralysis of the extraocular muscles; of vision, fields and papilledema; and of arteriovenous fistula. (17 references) Irwin E. Gaynon.

Marconcini, E. **Abducent nerve paralyses in cranial lesions.** Riv. oto-neuro-oftal. **32**: 575-581, Sept-Oct., 1957

The author describes two cases of unilateral and bilateral abducens nerve paralysis. Both patients had been involved in traffic accidents and had had head injuries. The author concludes that the paralysis is the result of a lesion in the region of the petrous apex. (1 figure, 6 references) William C. Caccamise.

Scassellati Sforzolini, G. **Pupillary disturbances in isolated paralyses of the inferior oblique muscle.** Riv. oto-neuro-oftal. **32**:582-589, Sept.-Oct., 1957.

The author discusses the anatomy of the innervation of the internal and external oculomotor systems. He also presents the case history of a patient who had been struck by a piece of iron in the left inferior temporal orbital region. Ocular examination revealed normal pupillary reactions and paralysis of the left inferior oblique muscle. Follow-up studies showed recovery of the involved inferior oblique muscle. (3 figures, 4 references) William C. Caccamise.

Smith, H. E. **Anterior chamber hemorrhages following non-perforating ocular injuries.** Tr. Pacific Coast Oto-Ophth. Soc. **38**:97-108, 1957.

Cases of hyphema are tabulated as to their etiology and also as to the presence or absence of secondary bleeding. Comparing the patients with secondary bleeding who had been on complete bed rest and had both eyes covered with those who did not have patching and bed rest, one comes to the conclusion that this is the most important treatment we have to offer; by decreasing the number of secondary hemorrhages we also decrease the incidence of severe loss in visual acuity. The author describes how erythrocytes were tagged with P 32 and were found to abandon the eye through the iris crypts, which shows that the use of atropine in cases of hyphema is contraindicated. In hyphemas more then 6 mm. in size, the use of pilocarpine is beneficial. (5 tables) Walter Mayer.

Spallino, A. **Ocular motility defects due to cranial trauma.** Riv. oto-neuro-oftal. **32**:561-567, Sept.-Oct., 1957.

The author reviews a series of 25 patients who presented stabilized defects in ocular motility following head injury. The oculomotor paralyses or pareses were either nuclear or subnuclear. There was a rather even distribution among the third, fourth, and sixth nerves. (1 table, 19 references) William C. Caccamise.

## 18

## SYSTEMIC DISEASE AND PARASITES

Bengisu, Naci. **Marfan's syndrome (report on three cases).** Bull. et mém. Soc. franç. d'opht. **70**:106-125, 1957.

Three patients with Marfan's syndrome are discussed. The ocular anomalies were dominant and no reference was made by the patients to their pronounced skeletal anomalies. Other family members could not be examined because of the limited transportation facilities in Turkey. In the pituitary theory, the abnormal bone growth and the underdeveloped musculature are ascribed to disturbances in the anterior lobe of the pituitary and to deviations in the secretion of the growth hormone. In the mesodermal theory, the syndrome is ascribed to a general congenital mesodermal dysplasia which takes the

form of a hyperplasia in Marchesani's syndrome with spherophakia and brachimorphia and of a hypoplasia in Marfan's syndrome. Extended chorioretinal degenerations dispose the eyes to retinal detachment, especially after extraction of the subluxated or luxated lens. This also is the reason for the generally poor prognosis of lens extractions in Marfan's syndrome. A short survey of the literature from 1935 to date is included. (17 figures, 24 references)

Alice R. Deutsch.

Guyton, J. S., Zimmerman, L. E., Maumenee, E. A., Constantine, F. H., Cotardo, R. and Leopold, I. H. **Symposium: Collagen diseases.** Tr. Fifth Pan-Am. Cong. Ophth. 1:89-141, 1956.

Guyton, Jack S. **Differential diagnosis in collagen diseases.** pp. 89-95.

General symptoms and local manifestations of rheumatoid arthritis, rheumatic fever, lupus erythematosis, periarteritis nodosa, dermatomyositis and scleroderma are analyzed. The list is made in the same order of relative incidence. Common symptomatology of fever, malaise, cutaneous and articular lesions make difficult the early differential diagnosis. Frequent exacerbations accompanied by remissions make the prognosis quite somber. The presentation is focused on the finding in the joints, skin, muscles, heart, lungs and kidneys, purposely excluding those in the ocular apparatus. (10 references)

Zimmerman, Lorenz E. **Current concepts in pathology of the collagen diseases.** pp. 96-107.

A review of the current literature available on the subject is didactically analyzed by the author—an authority on collagen diseases—with emphasis on the modern laboratory approaches to the problem. The accepted idea of the connective tissue as an organ system capable of responding systematically as well as locally to injurious agents has gradually evolved since its formulation by Bichat. The tendency to include many other generalized diseases that only have one common feature with the collagen diseases is one to be condemned, unless the Ehrich suggestion to speak of "systematic diseases of the connective tissue" is accepted. This source of common confusion has been enhanced by the effectivity of ACTH and cortisone in many cases of diffuse collagen disease, leading to the assumption of a common etiology.

A few common pathologic—but not necessarily specific findings—are the mucoid degenerations observed after a disturbed fibroblastic activity, which lead to fibrotic degeneration with variable amounts of fibrinoid deposits in the basal substance. By the same token, the chemoserologic aspect offers as common features generalized plasmocytosis and lymphocytosis such as a depression of serum albumin and collagenase inhibitors and a rise in gamma globulins and serum mucopolysaccharides. These differences are valuable in the various phases of differential diagnosis; high titers of antistreptococcal antibodies in rheumatic fever, strong nonspecific agglutination reaction in disseminated lupus and specific precipitins in disseminated lupus. (2 tables, 46 references)

Maumenee, Edward A. **Ocular manifestations in collagen diseases.** pp. 108-113.

A list of the ocular structures most frequently involved in each one of the commonly accepted collagen diseases, as well as the changes in the C.N.S. leading to ocular disturbances such as palsies and nystagmus, is presented in a tabular form. Temporal arteritis, considered by some as a form of polyarteritis nodosa, Behçet's syndrome and other syndromes related to it like Reiter's, Steven-Johnson's disease and the ectodermatosis erosive plurifacialis are considered as related to collagen diseases. The enthusiasm to include any

ocular condition in which tissues with large amounts of collagen are affected has lead to the "nomination" of myopia and keratoconus for inclusion in this group. (2 tables, 14 references)

Constantine, Frank H. **General manifestations and symptoms in collagen diseases.** pp. 114-117.

The so-called diffuse collagen diseases —periarteritis nodosa, disseminated lupus erythematosis, dermatomyositis and scleroderma—are reviewed from their cutaneous, cardiovascular, renal, pulmonary, gastrointestinal, joint-muscle and neurological manifestations. A complete outline of positive findings is given for each disease.

Cotardo, René. **Evolution in collagen diseases.** pp. 118-126.

In the observation of 200 cases of affections of the collagen structures of the eye (cornea, sclera, iris, ciliary body, choroid, retina and optic nerve) the following has been found: superficial keratitis, deep keratitis, corneal ulcers, keratoconjunctivitis sicca, retinopathy, obstruction of the central retinal artery, papillary hyperemia and papilledema. The main characteristic of corneal, scleral and uveal lesions has been its repetition and resistance to any treatment. Regarding evolution, the eye shows early generalized mesenchimatosis, and if both diseases occur simultaneously, better conditions are offered by the eyes for an early diagnosis. Affections of some collagen membranes of the eye are seen to reappear or affect other structures during evolution, and they might even expose the whole organism later. Relations between collagenosis and glaucoma are still contestable. (1 table, 80 references)

Leopold, Irving H. **Therapy of collagen diseases.** pp. 129-141.

It is apparent that the therapy of collagen diseases which produce ocular manifestations is not completely satisfactory. Only in those instances in which one is fortunate enough to uncover an etiologic factor is there room for any feeling of security concerning the disorder. Such instances would be the development of lupus erythematosis after the use of Apresolin. This type of lupus seems to disappear with cessation of therapy. The development of polyangiitis nodosa following the use of sulfonamides may also disappear with the removal of the exciting agent. The clearing of collagen disease following the removal of malignancy is another example of favorable therapy. Most discouraging are the lupus erythematosus cases that fail to respond to any form of therapy, scleromalacia perforans that progresses in spite of all forms of treatment, temporal arteritis, polyarteritis nodosa, erythema multiforme and others which may continue in spite of treatment. (2 tables, 29 references)

G. Scioville-Samper.

Kincaid-Smith, P., McMichael, J. and Murphy, E. A. **Clinical course and pathology of hypertension with papilledema (malignant hypertension).** Quart. J. Med. 27:117-153, Jan., 1958.

The clinical course of malignant hypertension is analyzed in 197 patients and correlated with the pathologic material in 124. The authors consider the characteristic feature to be papilledema, almost always part of a generalized retinal edema. It seems to be a relatively uncommon condition and affects only one percent of people with a systolic pressure over 170 mm. The prognosis is almost uniformly bad. (9 figures, 22 tables, 63 references) Edward U. Murphy.

Laborne, A. **Ocular manifestations of diabetes mellitus.** Rev. brasil. oftal. 17:63-83, March, 1958.

This paper is only the first part of a larger work, in which the author discusses in detail the diabetic retinopathy, as the complication of greatest interest for the

internist. He analyzes the clinical findings in diabetic retinopathy and its relations to hypertension, arteriosclerosis and renal disease and he discusses in some detail the disturbed metabolic findings in diabetes. (82 references) Walter Mayer.

Larmande, A. and Margailan, A. **Paget's disease and the Groenblad-Strandberg syndrome.** Bull et mém. Soc. franç. d'opht. 70:206-215, 1957.

Paget's disease and Groenblad-Strandberg's disease are comparatively rare and always have been an interesting pathologic problem. Endocrine disturbances, anomalies in the phosphorus and calcium metabolism and degenerative inherited traits have been held responsible from time to time, but after extensive studies they were found not to be the cause for the basic pathogenesis after all. Abnormalities of the smallest arteries and capillaries could well determine isolated and disseminated disease of this type. A special susceptibility of the arterial walls is at present considered to be a very important etiologic factor. Vascular changes in the choriocapillaris are undoubtedly responsible for the visible abnormalities in the lamina vitrea and in the region of the macula. Vascular abnormalities also could be made responsible for the degeneration of the elastic tissue of the skin in predestined locations and for the dystrophic bone changes either in form of a thromboangiitis or by the formation of medullary shunts. These vascular lesions could be primary and peripheral or they could be secondary to a primary vascular lesion of the diencephalon.

A 59-year-old woman with bilateral nuclear cataracts, angioid streaks, degeneration of the macula and a pseudoxanthoma elasticum, restricted to the left axilla, was studied with great care. She also had osteitis deformans, nerve deafness, cardiac disease and an abnormal EEG which showed a cortical hyperexcitability and some dysfunction of the diencephalon. Blood chemistry was essentially normal. It is suggested that one take an EEG in every monosymptomatic or complete case of angioid streaks and Paget's disease. (63 references) Alice R. Deutsch.

Nano, Hector M. **Temporal arteritis with ocular involvement. Report of a case treated with prednisolone.** Arch. oftal. Buenos Aires 33:1-8, Jan., 1958.

Emphasis has been laid in recent years on the relatively frequent association of temporal arteritis with damage of the ophthalmic artery and its branches, leading to occlusion of the artery of the optic nerve, the central artery of the retina, or both. The condition, which is considered by some to be germane to periarteritis nodosa may give rise to the clinical picture of vascular pseudopapillitis (cf. François, J., Verriest, G. and Garon, A. Bull. et mém. Soc. franç. opht. 69:36, 1956), to the syndrome of occlusion of the central artery of the retina, or to the mere appearance of retinal hemorrhages.

The case of a 77-year-old man is presented where sudden visual loss appeared simultaneously with excruciating pains in the temples and with swollen and tender temporal arteries. Fundus examination was negative on the right side, while on the left a diffuse, whitish, papillar and prepapillar edema was seen. Vision was 0.9 with the right eye and 0.075 with the left. Blood sedimentation rate was markedly increased (Katz index: 87). Treatment with prednisolone in daily doses of 10 to 15 mg. resulted in complete cure of all observable lesions at the end of three weeks, at which time vision was 1.0 and 0.2 and the corrected sedimentation rate 42. (8 figures) A. Urrets-Zavalia, Jr.

# NEWS ITEMS

EDITED BY DONALD J. LYLE, M.D.
411 Oak Street, Cincinnati 19, Ohio

News items should reach the editor by the 10th of the month. For adequate publicity, notices of post-graduate courses and meetings should be received three months in advance.

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### DEATHS

Dr. George Gill, Elyria, Ohio, died April, 1958, aged 92 years.

Dr. Hugh Alva Ross Kuhn, Hammond, Indiana, died April 17, 1959, aged 62 years.

Dr. Frank Robert Slopanskey, Salt Lake City, Utah, died March 29, 1958, aged 78 years.

Dr. Charles Alston Thigpen, Montgomery, Alabama, died April 23, 1958, aged 92 years.

### ANNOUNCEMENTS

#### STUDY GROUP FOR REGIONAL OPHTHALMOLOGY

Ophthalmologists interested in the relationship of geographic, environmental, and genetic factors to eye diseases are invited to attend a meeting at:

Palais de Beaux Arts,
Room: La Rotonde,
23 Rue Ravenstein, Brussels
on September 11th at 11:00 A.M.

#### EYE DEPARTMENT IN ISRAEL HOSPITAL

The Jewish Agency for Israel is engaged in advising and assisting qualified professional personnel interested in the possibility of working in their professional fields in Israel. It has been advised that the Beilinson Hospital, which is located near Tel Aviv, Israel, and is the largest general hospital in the country, is planning to open a department for treatment of eye diseases and is interested in receiving applications for the position of head of the department.

The notice indicates that applications will be welcomed from persons of extensive experience and high ranking professional standing. Further details with regard to the position will be obtained in response to any inquiries which may be made by interested persons.

Anyone interested in this possibility is invited to communicate with:

Abraham Cohen, Director
Office for Professional Workers
The Jewish Agency for Israel
16 East 66th Street
New York 21, New York

#### SEMINAR ON GLAUCOMA

A seminar on glaucoma with particular emphasis on gonioscopy and the study of the anterior angle will be given at the Brooklyn Eye and Ear Hospital on November 17, 18, and 19, 1958. Ample opportunity for practical instruction in the use of the gonioprism will be given and material from the glaucoma clinic will be utilized.

The course will be given by Dr. Daniel Kravitz, assisted by Drs. Mortimer A. Lasky, A. Benedict Rizzuti, Abner S. Rosenberg, Nicholas P. Tantillo, and Samuel Zane.

Registration is limited to six ophthalmologists. Application and the fee of $50 may be addressed to:

Dr. Daniel Kravitz
Brooklyn Eye and Ear Hospital
29 Greene Avenue
Brooklyn 38, New York

### SOCIETIES

#### OXFORD CONGRESS

The 43rd annual meeting of the Oxford Ophthalmological Congress convened on July 7th at the University Laboratory of Physiology, Oxford. The meetings lasted through the morning of July 9th. On the program were:

"Welcome by the master," Sir Tudor Thomas; a discussion on "The influence of vascular changes in progressive failure of vision," openers: Prof. Sir G. W. Pickering, Dr. Robert Leishman, and Mr. L. H. Savin: "The rational use of topical antibiotics in ophthalmology," Mr. Frederick Ridley.

"Unusual evolution of retinal detachments," Mr. P. A. Graham; "Indications for clinical electroretinography," Prof. G. Karpe; "Early healing of the orbit after exenteration," Mr. L. R. McLaren; "Large penetrating corneal grafts," Mr. Derek Ainslie; "The role of ectoderm in the development of the crystalline lens," Prof. Paul Chanterishvili and Dr. D. Stenhouse Stewart.

"An idea for an operating lamp," Mr. I. Lloyd Johnstone; "Treatment of socket contraction," Mr. G. J. Romanes; "Correction of monocular aphakia by means of anterior chamber acrylic implants," Mr. D. P. Choyce; "Preventing loss of vitreous," Dr. H. J. Flieringa; "Complications and pitfalls of keratoplasty," Dr. R. Townley Paton.

A discussion on "The etiology and treatment of uveitis," openers: Mr. E. S. Perkins, Mr. Alan Stanworth, and Dr. R. D. Catterall; "Tonography in the early diagnosis of simple glaucoma," Dr. Wolfgang Leydhecker; "Studies in hemodilution in relation to the water test in chronic simple glaucoma," Dr. S. M. Drance.

The Doyne Memorial Lecture was delivered by Mr. O. Gayer Morgan of London, whose subject was "The early clinical diagnosis of glaucoma."

### MISCELLANEOUS

#### EYE-BANK

The Eye-Bank and Sight Conservation Society of Virginia has been affiliated with the National Eye-Bank in New York City. Dr. E. G. Gill, Roanoke, Virginia, has been elected a member of the council.

# PRESCRIPTION OPTICIANS

## *Urgent Request*

The Uveitis Laboratory, University of California School of Medicine, San Francisco, is interested to obtain freshly enucleated eyes from patients with *all types of uveitis* and other endogenous inflammations. Attempts are being made to isolate etiologic agents from these eyes.

The eyes should *not* be fixed in preservatives or frozen, but placed in a sterile bottle, packaged, and shipped as quickly as possible. Please send specimens air express, special delivery, *collect*. Enclose history and findings and mark the package "Fresh Tissue Specimen—Rush."

A report of isolations of organisms and pathologic findings, including a slide, will be sent to the contributor. Credit will be given in any resulting publications if desired.

* * * *

Telegraph collect if specimen being sent. Send eyes to Samuel Kimura, M.D., Michael J. Hogan, M.D., or Phillips Thygeson, M.D., University of California School of Medicine, San Francisco 22.

# *As requested by many Ophthalmologists !*
# *—the* **MODIFIED PANTOSCOPE •**

## *THE INCOMPARABLE "PANTOSCOPE"*

## *INTRODUCES THE "MODIFIED PANTOSCOPE"*

In response to very many requests, particularly from the American continent, for a simplification of the world-renowned PANTOSCOPE, we are now pleased to announce the 'MODIFIED PANTOSCOPE'

This is the 'scope for the doctor who appreciates the necessity for brilliant illumination —12 VOLTS 12 WATTS—more than enough for any fundus examination even in daylight. While giving the same superb vision as the famous PANTOSCOPE (many thousands of which are in current use by leading ophthalmologists thruout the world) this new MODIFIED PANTOSCOPE provides for direct and indirect ophthalmoscopy only.

*Detailed features include*

- Macular Beam, Iris Diaphragm.
- Ordinary or Polarised light.
- +40D. to −25D. viewing lenses.
- Compact filament lamp with plano cap for homogeneous light on fundus.

*Cloudy media, small pupils*

For better vision under such conditions, try the Modified Pantoscope with narrow macular beam, polarised light to minimise reflex, and full 12 watt power.

The MODIFIED PANTOSCOPE illustrated is fitted with the "SELECT-A-LITE" switch-base which provides finger-tip brightness control as part of the 'scope. You can vary the illumination while observing the fundus. The "3-way & off" switch gives 6 volts for direct ophthalmoscopy in ordinary light, 9 volts for direct use in polarised light and 12 volts for all indirect ophthalmoscopy. It fits any Keeler 12v. 'scope.

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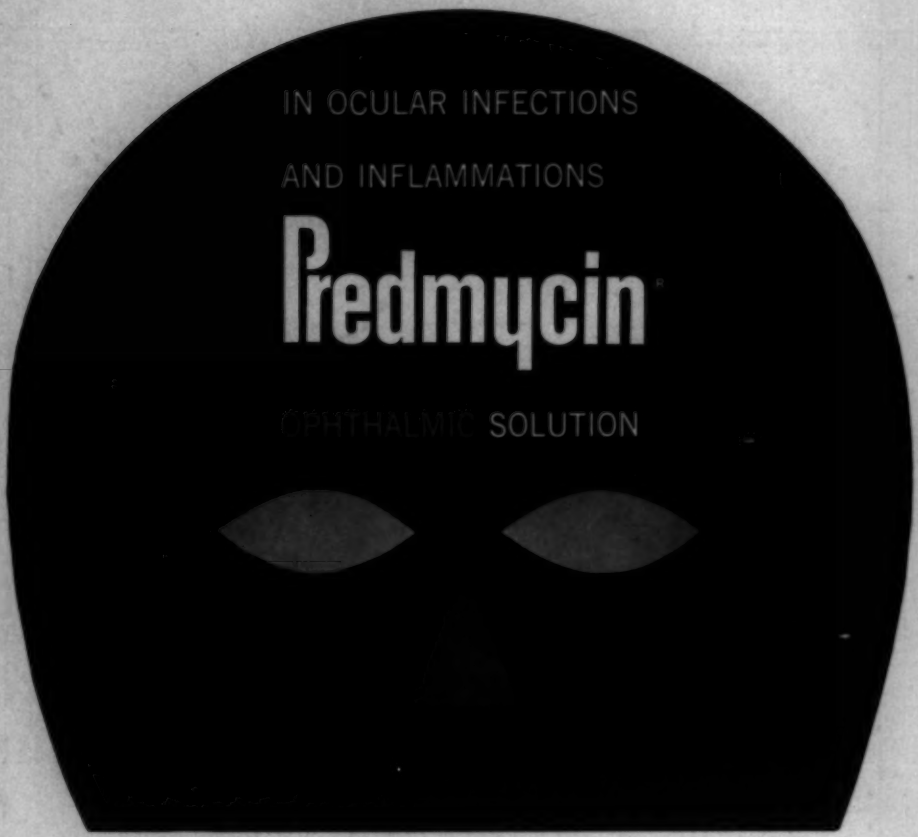


**TO TREAT THE PATIENT...THE PATHOGEN...THE INFLAMMATORY PROCESS**

New Predmycin Ophthalmic Solution, containing prednisolone, neomycin and a decongestant, provides unsurpassed three-fold therapeutic attack against infectious and inflammatory eye disorders:

- *for the patient: Phenylephrine HCl for rapid improvement of the eye's appearance*
- *for the pathogen:* Neomycin sulfate for its wide antibacterial effectiveness against most pathogens responsible for ocular infections
- *for the inflammatory process:* Prednisolone for its rapid and effective action in checking destructive inflammatory reactions to ocular trauma.

Predmycin combines prednisolone alcohol 0.2%, neomycin sulfate 0.5%, and phenylephrine HCl 0.12%, in a sterile, lubricating solution—for optimal control of infectious, inflammatory and allergic conditions of the eyelids, conjunctiva, cornea, sclera, uveal tract, and following thermal or chemical burns.

DOSAGE: 1 to 2 drops in the eyes two to four times a day.

SUPPLY: In 5 cc. all-plastic dropper bottles—on prescription only.

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